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A JOURNAL FOR THE ARCHITECT AND CONSTRUCTOR.

WITH WHICH IS INCORPORATED THE "BRITISH ARCHITECT."

VOL. CXXII.—No. 4118. JANUARY 6, 1922.

THE NEW YEAR: PROBLEMS FOR ARCHITECTS.

IN wishing the architects of Britain a Happy New Year we do so with a very full sense of the multitudinous issues upon which the happiness of the year may depend. Perhaps there has seldom been a time in which the career of the Royal Institute of British Architects has lain so open to variety of opportunity. We are not implying that there are great dangers ahead, or that the profession is beset by peril; but it is certainly clear to any student of the problems of the hour that there are a good many points on the road ahead at which a wrong choice of turning might be made.

The biggest thought of the moment is the great question of work for all. What is the prospect of prosperity? What chance is there of such a return on the part of the nation to the equilibrium of finance as will make building once more not a luxury for the rich but a necessity for the prudent? Happily we are able to see and to welcome signs that the madness of the workers in the building and kindred trades is abating. Not only are the prices of materials hopefully falling, but the spirit which has for years decreed that the day's span must contain a dishonest shortage of output and be paid with an excessive reward is going to the home of evil spirits. Rather than continue to speak of that spirit in the terms which it merits we prefer to congratulate the working men of all trades on the dawning resumption of that other spirit—the spirit of wholesome rivalry and of pleasure in performance which is essentially British. Much of our troubles has been due to false teachers and to false notions of fraternity. That these teachers are losing hold and that these notions are dying are most hopeful signs that Britons have a wish once more to be allowed to sing the last as well as the other lines of "Rule Britannia." Therefore, so far as architectural prosperity is dependent on national welfare and on normality in the building trades, there is hope. Not, perhaps, hope of immediate release from the stringency of the present situation, but hope of a gradual breaking up of the obstacles that to-day are still the friends of stagnation.

But there are other questions which hedge around the well-being of the architectural profession—one of them may be described as a question of internal politics; the other—or the others—are questions of relationship between architecture and the State. The technical problem to which we refer is, of course, the project of unification, which has now for so many months exercised the best brains of the leaders of the profession. To discuss the theme of unification in detail is, for obvious reasons, impossible. To say that a vast amount of attention has been given to it is merely to acknowledge that it is receiving the industrious discussion that it deserves. It is necessarily a problem of infinite complication, and although the only public light which has been shed upon it during the past five or six months has been the light of opposition, we are well aware that the friends and promoters of the scheme have been far from idle. Of the opposition we have, for the moment, only this to say: That if a scheme, however good, is admittedly complicated and avowedly one that carries with it some element of self-sacrifice, the path of the opponents is specially easy. Some comment was made on the fact that the President of the R.I.B.A. made no allusion in his inaugural address to a subject which must, one thinks, have been an ever-present absorption to his mind. We have every reason to believe that the omission was deliberate; that he looked upon the matter as one on which no pronouncement could wisely be made on so public an occasion, and that so far from his thoughts being withdrawn from the subject he has very deeply on his mind the successful completion of a policy towards which the leaders of the profession are very earnestly bent. We wish him and his colleagues every success in what is obviously a very delicate task, feeling sure that the good feeling and chivalry which has already been shown on both sides—by both parties—of the intended alliance deserves to be crowned by a triumphant success. The stages in the development of this policy are symptoms which show, as nothing else has equally shown, the large-hearted generosity and the keen sense of fraternal unity which actuate the whole profession. In fact, we are convinced that never in the history of modern architecture in England have the organised members of the profession shown a more solid front or a greater power. Stage by stage, year by year, the architects of England as a body corporate have won their way to a position which puts them in the forefront of the architectural unities of Europe.

It is this aspect of the profession which brings us to the consideration of the relationship of architects to the State. On one particular side—the educational side—this position is enviably strong. A well-considered policy of the Council of the R.I.B.A., advised by its Board of Architectural Education, has put the Institute into a commanding position as the centre of the architectural educational system of the country. The recent development of the grant of "recognition," which gives to certain approved schools the right of exemption for their pupils from a large part of the Final Examination, is as generous as it was just. It has not only offered a spur to education but has increased the prestige of the Institute to a degree which it richly deserves. It is the just reward not only of enlightened policy but of unremitting labour in a fine cause, and has made the Institute a power among the educational forces of the State.

There are, however, two important points of contact between the Government and the profession—one a passing incident, the other a more permanent relationship—on which good wishes, and perhaps good advice, may not be out of place. The passing incident is, of course, the issue between the architects and the Ministry of Health on the subject of housing fees, especially in relation to the fees for abandoned schemes—or, as the State dislikes the word "abandoned," for schemes compulsorily set aside. The situation which led to the impasse was an acute and critical one, and there can be no object in disguising the fact that the illogical dilemma was due to mistakes having been made on both sides. The machinery of the Institute being what it is, and the machinery of the State being what it is, it is natural that mistakes should be possible. This is no reflection on the quality of either machine, but it unfortunately happened that the mistakes in both quarters synchronised. It is unnecessary, perhaps, to go into the history of these mistakes or to repeat the details of them; there was obviously only one course open to the Institute, namely, to approach the Ministry with a clear *locus standi*. Such a *locus standi* could only be secured by admitting, with however much regret and reluctance, the actual and valid existence of the obnoxious Memorandum or Memoranda, and by sending as emissaries men whose mandate was direct from the general body. By the time these lines are printed we conclude that the duly-appointed *personnel* may be actually on its way to the necessary conference, and we have every hope that the very frank and open-minded action taken by the general body of the Institute will be met at the Ministry

not merely with the courtesy which is assured but also with sympathy and with full justice.

The other question of relationship between architects and the State is concerned with the old and vexed question of the functions of the Office of Works. It is easier for a journal than for architects themselves to speak freely on this point. When any body of professional men, however eminent, however worthy of respect, plead their own cause in a matter in which their means of livelihood is, however indirectly, threatened, the bystanders, as well as their adversaries, immediately take a heavy discount off the force of the complainant's argument. The taking off of this discount in the present controversy seems to us very unfair. The plain fact is that whether the State is in the right or in the wrong, the State (as H.M. Office of Works) undertakes a great deal of professional work which could, can be, and in the past was, entrusted to architects in independent practice. Architects have every right to feel anxious about this on grounds which it would be discourteous simply to call interested grounds. They also have the right on interested grounds, for interest, even pecuniary interest, is not felonious. It is fatally easy for the State or its friends to close the controversy by saying for the defendants that the State can do no wrong and against the complainants that their plea is tainted. But the real solution of the problem lies, it seems to us, in an appeal to the fair sense of the public. Suppose it to be granted that the present division of work between the State and the profession is a fair one, it may still be asked whether the public is prepared to see the limit shifted and the boundary pegs moved further onward towards the architects' citadel. Here, to continue our frankness of speech, is the danger; and the danger is one which is liable to be fostered by the existence of a phenomenon which is a danger in itself. The staff of the Office of Works is admittedly large. Large staffs are not popular at the present political juncture, and when a staff finds itself conspicuous by its magnitude there are only two courses open to it if it wishes to preserve the public favour and (perhaps) its own self-respect. It must either reduce itself or find itself sufficient extra work to justify its continued size. How the answer to this riddle is viewed from the inside of the office in question can be guessed. Let us add in all fairness that the Government servant has, like the independent professional man, the right to look with sympathy upon the problem of his own means of living.

If we have put these facts forward in a rather naked form it is for two reasons. The first is that we wish to plead with the architects in whatever negotiations or appeals may emanate from them to realise that the office in question has a *raison d'être*, that it does good work, and that its rank and file, as well as its administration, contain men of real ability who are, for all their bureaucratic garb, professional men. And we hope also that the approaches, which will no doubt be desirable, may be tempered with that spirit of reason without which any appeals can only appear to be self-interested wails of the kind from which the before-mentioned discount will inevitably be deducted.

But our second reason is the more interesting and the more cogent. The State has now as First Commissioner a peer whose qualities as a man of taste, of judgment, and of reason are altogether exceptional. To him we can look with unusual confidence for a sympathetic and perfectly fair view of a situation which certainly threatens to become an embarrassment unless some limits are placed to its developments. He is no mere office statesman, he is a man of the world—and, moreover, a man who moves in the world of art. It will, we are assured, be a pleasure to him to see not only that the share of outside advice occasionally sought by his department is strengthened and increased but to make sure that wherever England's predominance in the creation and preservation of works of art is at stake she never loses, in the interests of any bureaucratic officialism, the best artistic advice, the best artistic services, that the country's resources can provide. Perhaps we should not say so much were we not assured that the Earl of Crawford has given evidence of his determination to exercise the spirit of a truly liberal artist.

Old Monastery Church Outside Trient. From a sketch by MR. WALTER J. MILLARD.

ARCHITECTURAL SKETCHING.

BY WALTER J. MILLARD, F.R.I.B.A.

SOMEHOW it seems almost necessary to-day to apologise for venturing to hold forth openly and seriously on a subject apparently so old-fashioned, so negligible, as architectural sketching; and seeing with what really serious exercises the training-time for architects is filled up, as things go nowadays, one can only hope that it will not savour too much of levity to recall attention to the bare advantage that, even in these times, may accrue to the student of architecture who will be at pains to make himself master of the art of freehand sketching. To approach the matter from so low a level as this must sound rather uninspiring, but the fewer illusions that are raised the better perhaps to start with.

A good deal depends upon what is meant by sketching. The word itself seems to suggest something easy or slight. Sketching, for the architectural student, has not seldom been reckoned as an accomplishment which, according to luck, may—or may not—be thrown in with whatever training he gets. It has even been accounted a useful accomplishment so far as it goes. How far it may go is perhaps worth consideration. As a factor in the making of an architect, the power of freehand sketching might conceivably develop into something more than just an accomplishment in the hands of the aspirant, proving eventually a real source of strength to him for life. He that acquires this power, and wields it wisely, is self-equipped with special means of expression, a means of making plain in his own way to himself and to others both what he perceives with his organ of vision and what he visualises in his mind's eye—a potent auxiliary which is not entirely negligible.

In the training of the architect this power, like the art of writing in elementary education, is one of the initial acquirements for the beginner to possess himself of and to exercise; since the earlier he learns to wield it the sooner will it be at his service in his daily work. To him it opens new fields as he goes on, enabling him to glean knowledge first-hand by the recording of facts of his own observing, whilst, moreover, awakening in him certain faculties only latent perhaps, and not least among these the gift of imagination.

Take the case of a boy who, looking forward to his possible work in the world, resolves to be an architect—and youthful resolves can be strong, as some of us know, or where should we be? To effect his purpose he will need all the aid that he can summon. What surer start can he make on the enterprise than by drilling his eye and hand to serve him truly in his daily avocation? For the gaining of such command of his pencil as he can attain to, it is never too early to set about the business in earnest, and the sooner some proficiency is reached the better fitted will he find himself for his work ahead as he comes to it. This much may be advocated on the ground of its sheer utility as an educational foundation, to be put in early. It is nothing to play at, and he may find it to be no mean test of constancy to his early resolution. It is true he would hardly have formed such resolution without being conscious of some ability to draw, or at least without indulging in the fancy that he possessed aptitude for a calling which involved drawing.

Now he may apply the first test. Just as the beginner can learn to swim only by entering the water, so will he learn to draw only by putting pencil to paper. His subjects lie around him. However, since he will have no time of his life-span to waste if he is to succeed in attaining his main purpose, he may as well accept of advice—to proceed in his choice of subjects from simple, humble things to the complex and more alluring. To put names to only a handful one might suggest to start with, a field-gate or a length of fencing; a cart-shed or a chimney-stack; a piece of walling or the framing of a roof; a fireplace; a window, a doorway, or a porch; a cottage, a foot-bridge, or a church-tower; each one a sample of handiwork applied to building and, as such, holding its message to him, the would-be master-builder. Mindful of this he will, of course, from the outset wish to approach his subjects as a workman, aiming not only at catching just their shape and superficial appearance but at getting also at what they have to tell him of their make and the meaning behind the form; in short, he will try to cultivate what may be called the architect's "habit of mind." For, has he not vowed to be an architect? If, with like determination, he will now take care, whilst tackling each subject, to produce such a version of the thing as he could offer for testimony on oath, as containing the truth and nothing but the truth, even if not the whole truth be told in it (making, in fact, a record that anyhow is faithful so far as it goes, however slight it may be), then, on attaining any success in such endeavour, he will have put his faith in himself to the proof and have found his feet. On the other hand, the test may afford invaluable warning against pursuing further the architectural calling, in which case little or no harm will have been done.

Such a step in self-training as suggested is only what a resolute youth can accomplish, if he so wills, without overmuch spoon-feeding, and he that has willed the end won't want to jib at the first fence. Whether this bit of foundation work be entirely an effort in self-education, or a case of assisted endeavour, the student of architecture who has come through it creditably will presently find himself in possession of a small acquirement that gives him a certain standing amongst his fellows met with in school or office, some of whom will still be boggling at the elements of drawing.

By this time our young friend will have found that, for the representation of building-forms as they are in fact and as they are in appearance, the architect employs two methods of delineation, viz., geometrical drawing to scale for the one and perspective drawing for the other, and the sketcher will have realised that for him sketching is not going to be everything, by a very long way. One of the points he must comprehend with regard to these two modes of delineation is their interdependence, the fact that actually they are simply two ways of looking at the real thing. In time he will come to know that the man who masters the art of using both these means of expression, at will, to illustrate his conceptions has really accomplished more than just draughtsmanship; that incidentally he has trained not only his eye to see and his hand to execute by way of drawing but has also bent his mind to grasp things in the solid, so as to foresee at an early stage the resultant work as built. For this the architectural sketcher's habit of mind must be given its fair share of credit. The cultivation of the mental habit of thinking-out things "in the round" is the architect's affair no less than the sculptor's, and he that knows well what it is to portray in perspective the forms assumed by existing building work, from all angles of view, will not be likely to lose himself for lack of foresight in the detailing of his own work.

Accordingly, the student will be not unlikely to argue that the proper study of the architect is architecture, in the form of real buildings; and in his early glow of youthful enterprise and emulation he will want to go to find out for himself what other men have done in the world in the way of building work. But whilst still nursing his ambition, in school or office, he will be keeping his sketching-hand in; and as this gains in firmness his confidence will grow, and he will stand up to his subjects facing the difficulties in them squarely; getting lessons all the time in self-reliance, self-control, and resourcefulness well worth the trial and tribulation they cost.

Then, all in good time, let him go forth through the land, through this land and others, rejoicing in his freedom to exercise his judgment, to select and reject, to weigh and appraise, to draw inspiration, as architects ever have done in respect of the work of their fellows. What greater incentive to creative faculties than to find oneself face to face with the work of a master, and is it not the privilege of the humblest of us to purr with satisfaction on encountering a fellow-workman's piece of good workmanship?

Tower at N.-W. Angle of Wall, Andermach. (About 60 ft. diameter.)

From a sketch by MR. WALTER J. MILLARD.

Our friend, it may be presumed, will by now have found himself fairly on the road to becoming an architect, his aim in life. Well and good! But he has to discover that architectural sketching in itself is a very inadequate equipment for the campaign. Facility in this art might possibly even become a snare to him if he were to let his hand run away with his head and he were to lose sense of proportion in regard to the place of sketching in the evolution of the architect. Perhaps the greatest danger of all would impend if ever it should befall him to surpass the honest, painstaking efforts of his early days by having the grace bestowed on him to sketch beautifully. Still, even so, he may be master of his fate. Inevitably he will be assailed by the vice of mannerism, and, of course, he will not escape having to run the gauntlet of temptations beckoning him to stray away down by-paths, artistic, archæological, and otherwise, or even to take short cuts leading apparently to success or at least notoriety of some sort.

His best safeguard will be loyalty to his first impulse and resolve to be an architect. Remaining true to his early resolutions, he may humbly adopt as his motto, "Once an architect always an architect."

NOTES.

1922.

A New Year has dawned, and to those who can read the signs of the times there is as much cause for hope and assurance as for anxiety. It is particularly the hour of the younger men, of the men forged through the tempest of the past years, and it is the time to understand them. The danger for the older generation—and it is a very real one—is lest they should fail to realise what they are thinking and feeling. They are looking forward and they are looking at the facts. Far from any revolt against authority we believe that they are only too anxious for an authority which can justify their trust, and the idea that this is not so has grown through a misunderstanding of what is in their minds. That there is revolt against shams—solemn shams in high places—and an eager desire for reality, to see things as they are, should surely be welcomed, for in that direction lies the only security for all of us. It is particularly important for the arts that we should get down to the facts, and not any longer nurse illusions, however respectable and sanctioned by use and word; any inquiry as to the practice of architecture at the present time reveals a wide variety and also divergence of view. Except for those to whom everything is perfect in the best of possible worlds, changes are weaving themselves and influencing the younger men which should have their wide reaction on architecture. Our business is not to disregard but to try to understand them. We welcome this pioneer spirit and unite our wishes to all those who desire to see architecture more closely the expression and the reflection not only of phases in our national life which may be passing but of those more deep and permanent qualities which underlie and sustain it. It is in this direction, towards enlarging the scope of architecture to be more the expression of English national character in its best tradition, that our hopes must lie, and such changes in its practice as will forward this cause are not to be regretted but to be regarded as an assurance for the future which should be welcomed by us all.

The Building Industry and Facts.

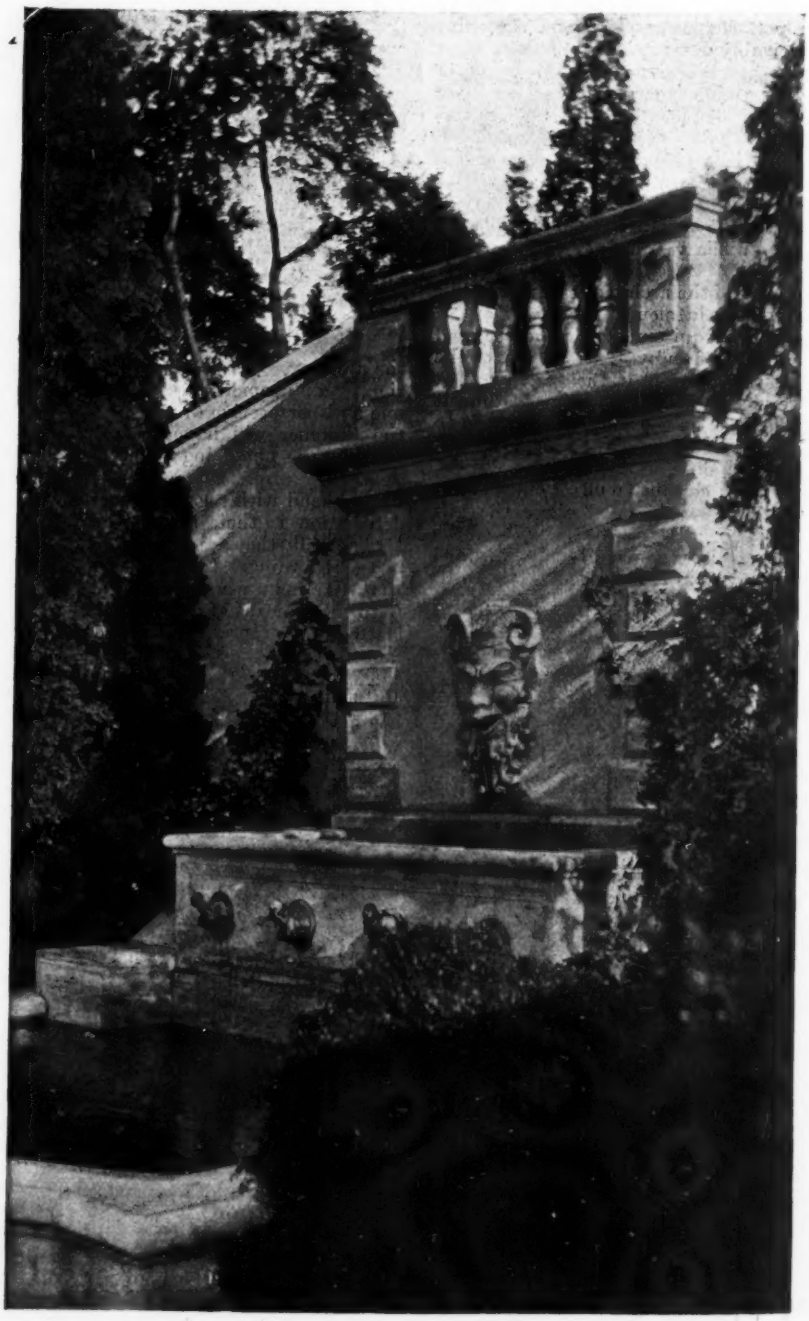
If the results of arguments and conferences between employers and employed is to leave us as far away as ever from better conditions in the building trade, one may well ask what is the good of them all. We must have cheaper production somehow, for it is useless to expect that building will be encouraged at the present high prices. We have received two communications this week on the difficulties which confront us. They are from Mr. S. Stranks (Organiser, Amalgamated Union of Building Trade Workers) and from Mr. Geo. Hicks (President of the National Federation of Building Trade Operatives), and deserve respectful and serious consideration. We are afraid we cannot claim to have fully agreed facts upon which to go, such as the real cost of living and real value of wages, or the real result of longer working hours on the cost of production, &c. The one insistent fact stands plainly before us all—surely none disputes it!—costs *must* come down. We wish the old-fashioned bogey would loosen its hold over us—that if we do our best we shall run short in the end. To produce good economic work is the lack of the whole world, and the claim for this can never slacken.

The Sheffield President's Address.

It seems to us that some very wise and pertinent words have been uttered by Mr. Chas. B. Flockton in his presidential address to the Sheffield and S. Yorkshire and District Society of Architects and Surveyors (see our last issue). We can only hope that these words will make a direct and convincing appeal to architects, builders and workmen. Mr. Flockton does not consider that for some time past the trade had given fair value for money received. Whether or not that is true matters nothing, if only the building trade will now give the utmost fair value and workmen the utmost possible value in production. If we get to work on sensible lines it will not be long before we all feel the pulsing vitality of better times. We could only wish that the sound common sense displayed in Mr. Flockton's address in regard to municipal developments and economics represented something like the views of all.

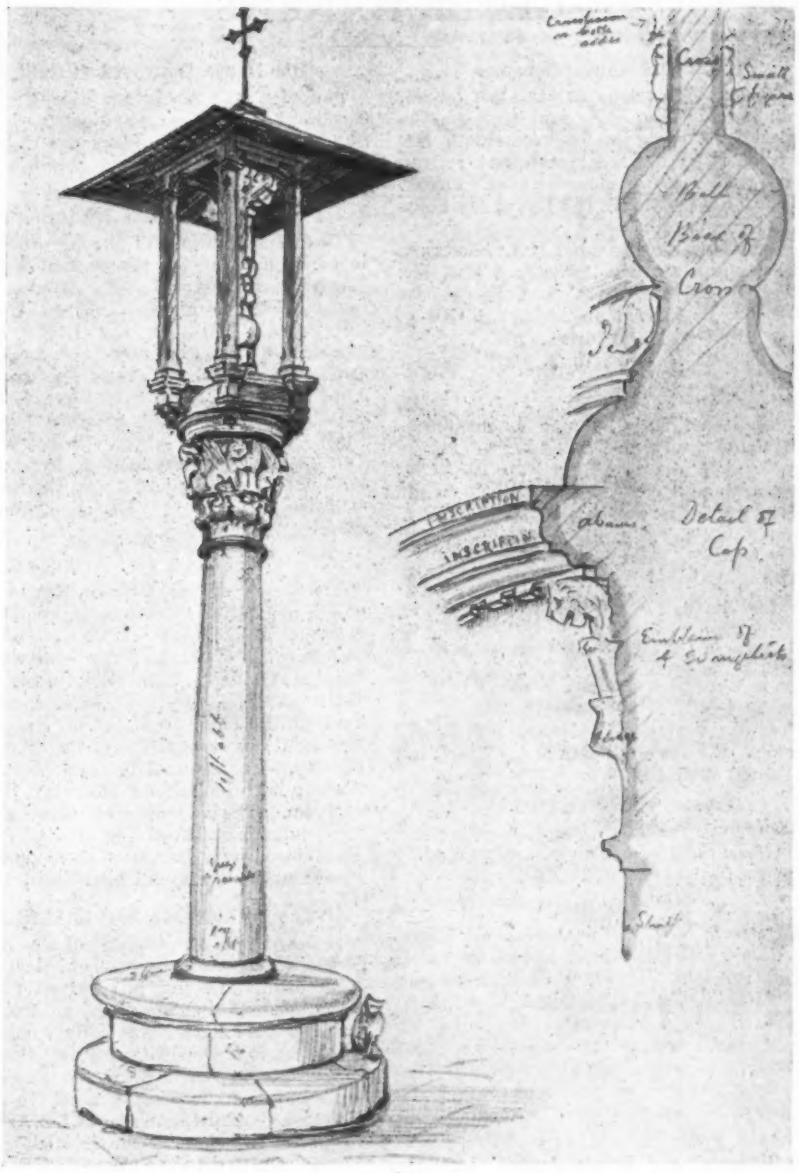
Official Art.

At first sight it would naturally be felt that there was nothing which demonstrated more clearly the governing thoughts and



FOUNTAIN BELOW GARDEN RAMP.
Shallow Brook Farm, Mount Kisco, New York.
MR. B. W. MORRIS, Architect.

ideals of the time than the character of our official art. Yet can this really be said to be the case? We think there is a better argument to be made for art and the national outlook than recent examples bestow. In the thirteenth century we find the subject-matter of art almost wholly concerned with religious interpretation, transcending man's temporal life and relating it always to the eternal. Life took the colour of the beliefs of its time, and art interpreted them. Is that the case now? The disparity lying between the official interpretation and the national life is to-day a menace to its stability. These considerations occur to us with startling force just now. Are we really now much concerned with the rather bumptious imperialisms of a somewhat belated scholastic school of politicians, whose conventional interpretations seem singularly out of date at the present hour? If only our official life could relate itself a little more with what people were thinking it would suggest a subject-matter less turgid, theatrical, and fire-eating, and its themes would be directed to those more in touch with present aspirations. Such official paintings as we have recently come across can hardly be taken to represent or to interpret with any sort of adequacy what we are thinking, for they include nothing but the most stereotyped and commonplace conceptions, hide-bound with red tape. Our purpose here is not to offer any criticism of the paintings themselves, but of those who, moving only in a narrow "court dress" circle, know nothing of what the nation is thinking at large.



Stone Cross, with Wooden Canopy, in Piazza della Croce at Trebbio, Florence.
From a Sketch by MR. WALTER J. MILLARD.

An Esperantist Society of Architects.

A NUMBER of Esperantist architects of Paris in 1914 made an effort to form an Esperantist Society of Architects, and the first meeting was to have taken place at the International Esperanto Congress at Paris in August of that year. Up to July the number of congress tickets taken by people from thirty-five countries was 3,600, but the war prevented that congress and others since then from taking place. It is now proposed to form the Society, and Mr. Henry Hyams, F.R.I.B.A., of Espero Farm, Sway, Hants, has written to us with the object of getting names of Esperantist architects. The following facts, he tells us, show that this society is needed. At least one winner of an international architectural competition has used Esperanto as the language of the competition; in all the professions people are meeting together in their international activities discussing their ideals, methods, interests and so forth, and they already have their international Esperantist societies; the status of a professional man is dependent to some extent upon his status in other lands; and other professional men are fixing their terminology in Esperanto.

Municipalities and Art.

IT is very important that provincial art committees should take a more serious view of their responsibilities than to call in others to advise them about matters on which it is their own business to be well informed. We are more concerned as a nation with what unites us to others, those reconciling ideas—religious, we should call them—that tend to the humanising and binding of human life together, than with the old, rather rusty, doctrines of self-aggrandising imperialism. We might look nearer home in the pride of our local life and institutions and give representation on the walls of our public buildings to those subjects which best illustrate and affirm those ideals on which its stability rests. Municipal bodies and local art committees who have the matter of the decoration of their public buildings before them will, we trust, escape the contagion of this official art, and no longer call in to advise them any who are identified with its sometimes unintelligent mediocrity.

Cleaning Old Masters.

IT would appear from a letter in a contemporary from Mr. P. Tudor-Hart that the restorer's hand has been as dangerous to pictures as it has been to buildings, and that as a consequence of much of the picture restoring that has taken place in recent years a great injury has been done; and the future permanence of the pictures so restored is imperilled thereby. The writer, in the course of his letter, points out that, "a recent trip to Italy and another to Munich have convinced me that if any Old Masters are to be preserved for future generations something must be done without delay to save those few pictures that have not yet suffered irretrievably at the hands of the restorer." This is sufficiently grave, and we should like to know if Professor Laurie shares the same views. Apparently linseed oil, which when properly refined is far the most suitable and lasting, having qualities possessed by no other known medium, has, owing to the impurities existing in all linseed oils, fallen into disrepute.

GENERAL NEWS.

Professional Announcements.

Mr. Stephen Wilkinson, A.F.C., F.R.I.B.A., has been appointed Chief Architect to the North Eastern Railway Co., in succession to Mr. Arthur Pollard, F.R.I.B.A., who has retired after forty-eight years' service with the Company. Mr. Wilkinson served with the Royal Air Force during the war.

Mr. Herbert A. Welch, A.R.I.B.A., has taken into partnership, as from January 1 last, Mr. H. Clifford Hollis, A.R.I.B.A., and the practice will in future be carried on under the title of Welch & Hollis. The address, No. 7, New-square, Lincoln's Inn, W.C., will remain unchanged.

Mr. Norman G. Bridgman, F.R.I.B.A., has taken his son, Mr. Gerald S. Bridgman, A.R.I.B.A., into partnership. As hitherto, the practice—which was established by Mr. Geo. Soudon Bridgman over 60 years ago—will be carried on under the titles of Bridgman & Bridgman, at Fleet Chambers, Torquay, and 1, Palace-Avenue, Paignton.

Mr. John Watson, F.S.I., Cogan Chambers, Bowlalley-lane, Hull, has been appointed Rating Surveyor and Valuer to both the Selby and Goole Boards of Guardians, in succession to the late Colonel Wellsted.

An Architect's Estate.

The late Mr. James Milne Monro, F.R.I.B.A., of Bearsden, N.B., who died on June 7 last, left estate valued at £3,242.

Dunoon War Memorial.

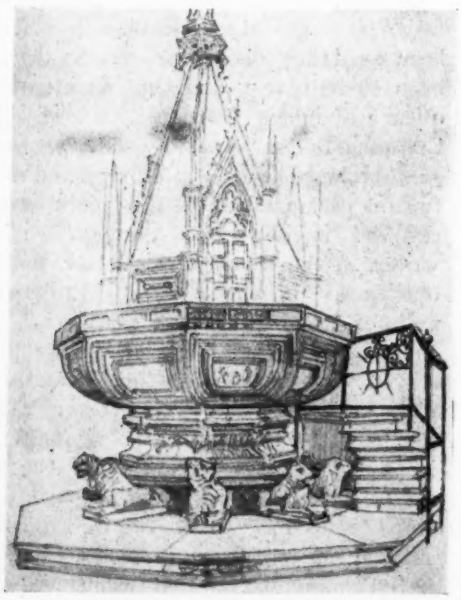
The Dunoon War Memorial Committee has accepted the design for a memorial submitted by Mr. George Barr, architect, Glasgow.

"The Blue Boy."

In less than a month, Gainsborough's famous "Blue Boy" will leave England for America. Meanwhile it has been lent by Sir Joseph Duveen to the National Gallery, where it will be on view till Tuesday, January 24. Since Sir Joseph acquired the picture the surface has been carefully cleaned, with the result that the impression made by this masterpiece upon its first appearance can now once more be understood.

The Auctioneers' and Estate Agents' Institute.

The Auctioneers' and Estate Agents' Institute has entered into a contract for the purchase of a freehold site in Lincoln's Inn-fields, on which it is intended, in the course of the next two or three years, to build new headquarters for the Institute.



Font in Red and White Marble in Nave, Orvieto Cathedral.

From a Sketch by MR. WALTER J. MILLARD.

Old House Destroyed at Guildford.

One of a pair of sixteenth-century shops in Guildford High-street was destroyed by fire on Sunday last. The building dated from 1536, and had recently been purchased by the Corporation to save it from demolition.

The Concrete Institute.

The annual dinner of the Concrete Institute is to be held at the Savoy Hotel, W.C.2, on Thursday, February 2 next. Among the guests expected to be present are Sir Alfred Mond (Minister of Health), the Right Hon. Earl Crawford (First Commissioner of Works), the Bishop of London, the Lord Mayor of London, Lord Riddell, Sir Aston Webb, P.R.A., Mr. W. B. Worthington (President of the Institution of Civil Engineers), Mr. Paul Waterhouse, P.R.I.B.A., Mr. J. H. Sabin (President of the Surveyors' Institution), Sir Charles Ruthen (Director-General of Housing), and Mr. H. Greville Montgomery.

The Society of Architects.

The annual dinner of the Society of Architects will be held at the Picture Galleries of the Princes Restaurant, Piccadilly, W., on Wednesday, February 22, at 7 p.m. The chair will be taken by the President of the Society, Sir Charles T. Ruthen, O.B.E. During the evening a presentation will be made to Mr. E. J. Sadgrove (Past President) in recognition of his services to the Society.—The Annual General Meeting of the Society is to be held on Thursday, January 12, at 8 p.m. The business of the meeting, including the Council's and Auditors' Annual Report, will be followed by a discussion to be opened by the President on "The Architect and the State."

The Institute of Scottish Architects.

A meeting of the Council of the Institute of Scottish Architects was held last week at Edinburgh, Mr. A. M. Paterson (Glasgow) presiding. It was intimated that the petition for a Royal Charter was fully completed, and would be lodged with the Privy Council at an early date.—With regard to housing fees, a representative was appointed to meet the Practice Committee of the R.I.B.A. in London to submit the views of the Scottish architects.—It was remitted to the Competitions Committee to decide as to what was comprised in a small limited private competition.—A committee was appointed to consider and report to next Council meeting as to the issue of a journal quarterly to the members.

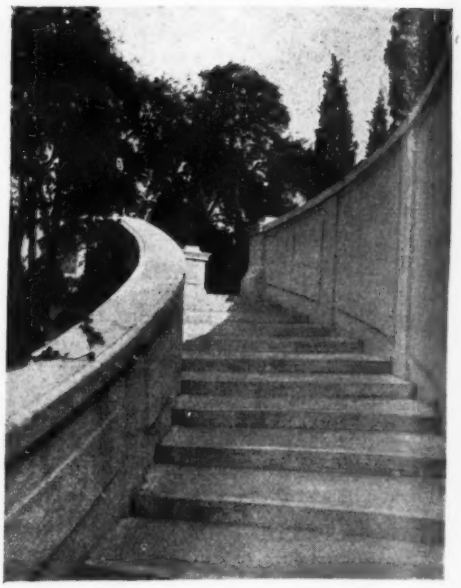
Obituary.

We regret to learn, as we go to press, of the death of Mr. Edward Arthur Fellowes Prynne, the artist, and brother of Mr. G. H. Fellowes Prynne, F.R.I.B.A., which took place on December 28 last.

The death of Mr. Henry La Trobe, F.R.I.B.A., of Messrs. La Trobe & Weston, architects, of Unity-street, College-green, Bristol, occurred at his residence, 64, Cotham-road, Bristol, on December 30. Mr. La Trobe designed the Industrial School of Art, Bristol, and also many chapels in the city, including the Tyndale Mission, ow the Folk House, and Horfield Wesleyan. He was formerly in partnership with Mr. I. Foster, and with him carried out the Broad Plain Mission House, and the hall of the Bristol Y.M.C.A. One of the last buildings which Mr. La Trobe was connected with was the Whiteladies Picture House, Clifton, which was opened in November last. The deceased was sixty years of age.

The Architects' and Surveyors' Assistants' Professional Union.

The third event in the winter social programme of the Architects' and Surveyors' Assistants' Professional Union is to be held on January 31, at Australia House, Strand, W.C., and will take the form of a fancy dress ball. Tickets, price 5s. each, may be obtained from Mr. J. A. Gould, Honorary Secretary of the Social Committee, at 36, Victoria-street, Westminster, S.W. These social events have proved so successful that similar events are being held in districts around



Garden Ramp, Shallow Brook Farm, Mount Kisco, New York.

Mr. B. W. MORRIS, Architect.

London, the first of which—a dance—took place at Croydon, on December 22, when Mr. A. P. Althorpe acted as M.C. and forty-five couples took part. The event was enlivened by a cake weight-guessing competition, which was won by Mr. A. C. Oliphant, after he had tied with Mrs. V. Gould. The event was highly successful, and at the conclusion Mr. Fred Williams was congratulated on the admirable manner in which he had arranged it.

COMPETITION NEWS.

"Owen Jones" and "Mulready" Prizes.

The Council of the Royal Society of Arts offers six "Owen Jones" prizes in 1922 for the following subjects:—Architectural Decoration (including stained glass, mosaic for walls and floors, plasterwork in relief and incised, inlaid marble and stones, and lettering for memorials); Woodwork and Cabinet Work (including carving in wood, ivory and bone, inlay, chairs, chests, cabinets); and Textiles (including tapestries, carpets and rugs, moquettes, and floor-coverings). Each prize will consist of the Society's Bronze Medal, and books on applied art of a value not exceeding £2. In addition, a special prize of £20 is offered, under the Mulready Trust, for the best design (irrespective of class) submitted for competition. The competition is limited to students of schools of art. Sending-in date, June 12 to 17. Further particulars may be obtained from the Secretary, the Royal Society of Arts, John-street, W.C. 2.

Paisley.

About 200 designs have been received in the Paisley war memorial competition. The assessors, Sir Reginald Blomfield, R.A., and Mr. D. Y. Cameron, R.A., assisted by Mr. John A. Holme as representing the Committee, will examine the designs on January 13 and 14.

Dundee.

FOR THE DUNDEE WAR MEMORIAL COMMITTEE.—Designs for a war memorial. (See advertisement this week.)

Malvern.

Members of the Royal Institute of British Architects and the Society of Architects are notified that the conditions of the Malvern Public Baths Competition do not comply with the competition regulations, and are requested not to take part in it.

Other Competitions.

Other competitions still open include: Seaford lay-out (Sending in date, Jan. 23); Truro memorial (Jan. 21) (banned by R.I.B.A. and Society of Architects); Kirkcaldy memorial; Auckland memorial (May).

CORRESPONDENCE.

Unification and Registration.

SIR,—I find in your issue for December 23 another letter on unification and registration, in which we are told again that the Council of the R.I.B.A. approves of opening the doors of the Institute to "all architects of the United Kingdom," and the words are added, "without test or examination." The letter is signed by Mr. A. W. S. Cross and Mr. George Hubbard.

Leaving for the present the question whether anyone should publicly oppose the policy of the Council while holding the position of a Vice-President, I wish to point out once more that there is, and has been, no question of admitting any but qualified men. At the Council meeting on May 23, a report of nine printed pages, setting out Scheme "A" and Scheme "B," was dealt with, and the following very brief resolution passed: "That the principle of Scheme "A," namely, the bringing of all architects of the United Kingdom into membership of the R.I.B.A., be adopted as the basis for unification." (Scheme "B" was the federation scheme.) Scheme 'A' refers throughout to qualified architects, and to qualified architects only, and it provides for them to be placed in the class appropriate to their qualifications. Both signatories of the letter had this report, both of them understand the nature of the principle involved; is it "cricket" for them to endeavour to convey by means of the Press the impression that the R.I.B.A. proposes to admit without test or examination all who apply? The thing is, after all, almost too grotesque to be taken seriously. The writers of the letter know, and I now remind them of it, that it is proposed to set up a Board of Incorporation which shall be the sole judge of the qualifications of candidates. One welcomes sound criticism, but this criticism is neither sound nor ingenuous.

As for registration, the writers of the letter are entitled to the opinions they hold on the probability of securing it; but they and all others may rest assured that we shall never get it unless we can go to Parliament with the solid backing of the whole profession.

ARTHUR KEEN,
Hon. Secretary.
Committee on Unification and Registration.

Abandoned Housing Schemes.

SIR,—I have seen Mr. J. H. Kennard's letter in your last issue, and think his suggestion a good one. Any movement which will unite those members of the profession who have been directly affected by the abandonment of the Government's housing policy should be supported. An early decision is of the utmost importance, and I therefore urge all members to communicate with Mr. Kennard at once.

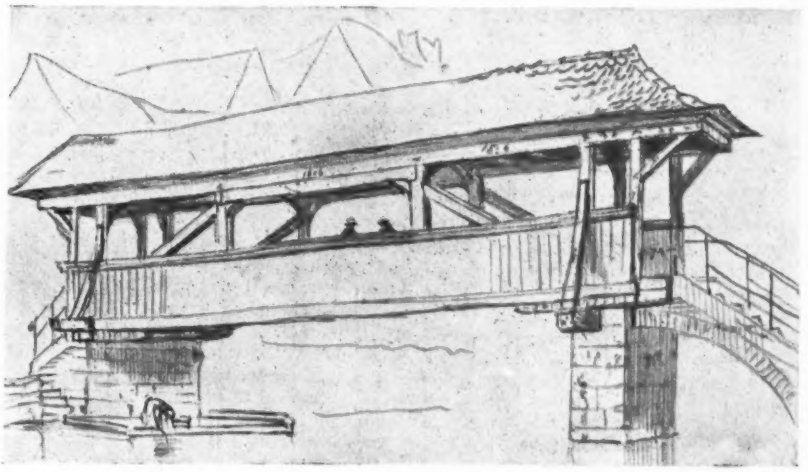
London. W. S. GRICE, A.R.I.B.A.

The Outlook in the Building Industry.

SIR,—With regard to the prospects of architects and the building industry for the New Year, I have made several inquiries amongst my professional brethren and amongst the leading builders of this district, and find that their replies assume an optimistic or pessimistic tone according to the temperament of the individual. On one thing, however, there is general agreement, that is, there is no lack of employment at present. The building trade, as a whole, is moderately busy, and I believe there is little unemployment amongst the workers. The building prospects vary with the prosperity or otherwise of our two staple industries, boots and hosiery. At the moment, although the latter trade is flourishing, the boot industry has been slack for some time. Nevertheless, many proposals have been made by manufacturers for extending their premises, or building new ones, but these are temporarily postponed. In common with other districts, political matters affect us indirectly, and we are hoping for good things from the settlement of the Irish question and the results of the great conference at Washington.

The provision of houses in the city is proceeding slowly and is likely to extend during the year. In the adjoining rural and urban districts, it has become more or less a "dead letter." Prices of labour and materials appear to have reached the high water mark at the end of 1920. Since that date bricks have been reduced 15s. per 1,000; cement, by 10s. a ton; steel bars, by £20 a ton; and timber, by £18 a standard. The wages of craftsmen have dropped 12½ per cent. and labourers 22 per cent. This drop in prices is encouraging and hopeful for the future of the building industry, and further developments are being watched by architects and their clients alike.

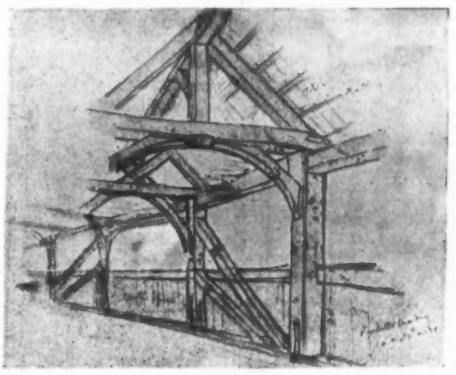
WILLIAM KEAY, *President.*
The Leicester and Leicestershire
Society of Architects.



Wooden Bridge across River at Amberg.

[About 40 ft. span between piers.]

From sketches by MR. WALTER J. MILLARD.



INTERIOR.

Architects' and Surveyors' Assistants' Professional Union.

SIR,—All assistants in the architectural and allied professions must feel that Mr. Hector, the General Secretary of the A.S.A.P.U., claims no more than justice for them in his demands for the alleviation of the professional worker's burden of income tax, and his right to share in unemployment schemes. The position of the professional worker to-day is tragic. His case is sandwiched between the ramifications of the employers' associations on the one hand and the demands of the manual worker on the other. The little he does contrive to earn by his labour is mulcted by the State's presentation of an income-tax bill which is based on principles which show no official consideration of the professional worker's unique position. To take the case of architects' and surveyors' assistants. You will agree that no other section of the community requires more technical books, instruments, &c., than does the above mentioned. Their education does not come under the heading "free," as a glance at the various technical schools' syllabuses will show. To be qualified they must be members of a professional body; whilst to ensure that their position does not become too untenable the formation of such an organisation as the A.S.A.P.U. was a protective necessity. All this professional expenditure is a deduction from a remuneration which, on the average, does not amount to 50 per cent. of the Union's scale of minimum salaries. Certain employers' federations have obtained for their members the right to deduct from taxable income the amount of subscriptions payable to the funds of their protective or other associations. The manual workers are granted allowances for tools, clothing, travelling, and other outlays. So far, however, the professional worker has been unable to make his demand for like privileges heard. Surely Mr. Hector's Executive Council can therefore count on a full support in the demands which he makes for the deduction of the professional assistant's subscription to his Union.

I therefore suggest that every assistant in the architectural and surveying professions sees that his local M.P. is made perfectly aware of the need for these demands being put into effect, and to show that he will be expected to support any steps taken in the House of Commons to right this injustice.

Regarding unemployment schemes and the professional worker: no consideration whatever is accorded him in any of the present relief schemes. If it so happens that a technical assistant is required on a scheme, well and good, but if none is wanted so ineffective is the voice of the few affected that it escapes notice. Such is the official mind, but we assistants have now a collective voice and its mouthpiece is the A.S.A.P.U. Let, therefore, its members see that the slogan, "Justice for the Professional Worker," is sent out to rouse to instant action the nation's representatives at Westminster. Such action is expected of all architects' and surveyors' assistants, and their first step should be to join this body, whose avowed object is epitomised by its motto: "One for all and all for each."

JOHN MITCHELL,
Honorary Divisional Secretary (Scotland),
A.S.A.P.U.

THE ARCHITECTURAL ASSOCIATION.

Mr. W. G. Newton (President) occupied the chair at a general meeting of the Architectural Association at 34-35, Bedford-square, W.C., on Monday last.

Election of Members.

After the minutes of the previous meeting had been passed, the President announced ten nominations for membership, and the following were unanimously elected members:—

D. M. Micklethwaite.	H. C. W. Dod.
J. R. Piggott.	D. S. Petrovitch.
A. P. Gracie.	E. E. Prower.
H. F. Buckland.	

Mr. T. C. Agutter (member 1884) was reinstated.

WHAT WE CAN LEARN FROM CLASSIC ARCHITECTURE.

Mr. H. S. Goodhart Rendel then delivered an address, entitled "The Study of English Post-Renaissance Architecture: What we can Learn from it." Before considering the study of post-Renaissance architecture, he said it would be well to be sure in their minds that architecture was worth studying. Probably few of them doubted that it was, but how many of them had any definite conception of the kind and degree of its value? What and how much did they expect to learn from it which could not be better learnt elsewhere? There were some people who said that an English artist could never learn anything better elsewhere than in England. To them national peculiarities were the most precious things in art. With those people he disagreed utterly. He could not think that an inferiority, however national and peculiar, could ever be precious, and he thought it as foolish for an architect to study his orders from Batty Langley rather than from Vignola as he would think it for a composer of music to study the sonata form from Sterndale Bennett rather than from Beethoven. There were others who said that an English architect could nowhere learn anything better than he could in Paris. With these he was more in sympathy. In fact, he thought it true that an English architect could nowhere learn certain things better than in Paris. But Paris did not teach how to plan houses for English folk to inhabit, and he thought the Parisian notion of a small town hall, of a branch bank, or of a little art gallery would look rather strange in an English county town.

Since the Renaissance, Italy had been the greatest school for European architects. Italian antiquity was the spring and the Italian Renaissance the reservoir from which during three centuries all Europe drew her architectural supply. If English architects went to Paris for their theories, both they and the Parisians must go to Rome for their facts, unless they were content to get their knowledge at second-hand. Yet Rome, like Paris, though it might teach them what to say, could not teach them how to say it in their own tongue. Belgium, the Peninsula, Germany, Scandinavia, all periodically might tempt English architects to looting expeditions, but would hardly be proposed as schools for systematic study. Ancient Greece afforded an exclusive range of trimmings for garments cut on post-Renaissance lines. If they wandered outside Europe they could find the Doric in its infancy at Beni Hassan, or the Renaissance in its second childhood in modern America. All of those could give something, but they could not give everything. None of them could teach us a few little things which might be learnt at Greenwich or at Hampton Court. What those little things were was the question we had put to ourselves, and he thought they would be helped to answer it by an elimination of several things which they certainly were not.

To-day, as in the seventeenth and eighteenth centuries, the decorative part of civil architecture consisted chiefly in the application of orders. He gave no opinion as to whether that should be so; he merely stated that it was so. Now as then that decorative part very often had the upper hand of the useful part, and a building was made Corinthian first and convenient afterwards. The order might either be present in the body, with columns and pilasters, or present in the spirit, with nothing of it embodied save the entablature; but present it would be, exercising the discipline of a drill-sergeant over the projections and the recesses, the solids and the openings of the design.

Of the orders themselves he did not think there was much to be learnt from the English buildings of the period they were about to discuss. Before the publication of Evelyn's translation of Freart's "Parallèle" in 1664 what little was known in this country of the Classical orders was derived either from corrupt Dutch pattern-books or from the imported Palladianism of Jones and Webb. In Fréart's "Parallèle" were revealed to Englishmen for the first time the orders according to Palladio, Scamozzi, Serlio, Vignola, the patriarch Barbaro, Cataneo, Alberti, Viola, Bullant, and de l'Orme, together with well-chosen examples from antiquity. To the men of the time that must have been a confusing enough initiation into the Classical mysteries. It appeared, however, from Inigo Jones's practice and from the preface to Fréart's book that whoever should imitate Palladio could not go far wrong. Palladio therefore became almost universally followed, generally at a considerable distance. In the days of Dutch William, Palladianism met with a check, and on the accession of George I it was fiercely assailed by Teutonic influences. The orders were often violated and mutilated in the strife, but as time went on their immunity was reasserted. Architects submitted anew to the Palladian rule, and remained loyal until they were tempted by the graceful neo-Classic of such decorators as Pergolesi. To counteract the influence of such men Chambers in 1759 produced his great book, in which he included an excellent and original version of the orders collated from ancient and modern models, but derived in the main from those of Palladio. Chambers's attempt, however, was of no avail, and the Pergolesis, aided by such architects as the Adam Brothers, James Stuart, and James Wyatt, triumphed completely. As the century closed they in their turn were giving place to the purist forerunners of the Greek revival.

The lecturer criticised at length the application of the orders in English buildings during the period under discussion, which we hope to report more fully in our next issue.

In reply to questions raised, the Lecturer said he did not agree that the oblong tower of St. Mary-le-Strand was good; looked at from Kingsway it reminded him of a hoarding. He thought the practice of rendering drawings was invaluable to the student, and was a legitimate extension of school work. In regard to St. Paul's Cathedral, he thought Wren apparently wanted to use only one order for the total height of the building, but chose two because he could not get stones big enough for one. He thought one order was a better solution of the problem, and he preferred only one order. He did not think the tremendous scale of the one order of St. Peter's, Rome, detracted from the effect of that building; it took a little time to realise, but it all seemed to be part of the design, and very fine.

A vote of thanks to the lecturer was carried with acclamation.

Firemen's Houses (with Fire Station in the distance) at Tilbury, for the Port of London Authority.
Mr. Edwin Cooper, F.R.I.B.A., Architect. (*See p.* 16.)

THE OUTLOOK IN THE BUILDING INDUSTRY.

IN eliciting the opinions of some of the Presidents of the various societies allied to the R.I.B.A. on the prospects of the building industry, we succumbed to a natural desire to be able to present to our readers at this season some message of encouragement for the New Year. We are grateful for the response to our inquiries, and are impressed with the careful and reasoned manner in which the opinions have been expressed. One of our correspondents truly remarks that the rôle of prophet has rather gone out of fashion; it is much safer to deal with the year which has passed.

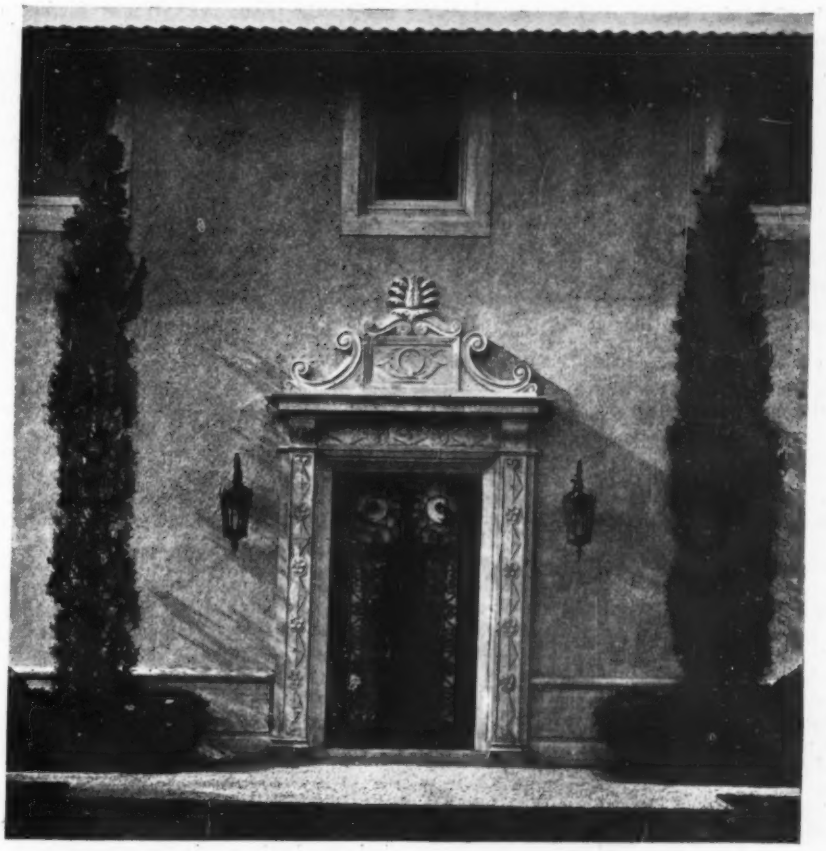
Superficially the past year has been a sombre year, a year of domestic discord and difficulty, a year of unemployment, a year of crises abroad, and threats of crises at home. The war brought artificial prosperity to many, and the penalty had to be paid. During the past year we have been paying, and have witnessed a gradual readjustment of our economic conditions. This phase evidently represents the return to sanity, to which several of our correspondents refer—or is it that the altered economic conditions have brought sanity with them? The events of the past year have been presented to us in a way which cannot be ignored; unemployment and hard times come to enlighten us when we refuse to admit, and try to avoid, the consequences of an unhealthy economic condition.

We are glad to record the gradual demobilisation of trade and industry from the fetters which the war imposed upon them. The experience of the Government as a trader has been a complete failure, and the serious coal strike was in a great measure due to the hurried termination of a State control when the industry was beginning to feel the depression in trade. A similar position is likely to arise with the railwaymen when Government promises will have to be broken, and it is to be hoped that these regrettable lapses will be forgiven in the common interests of the country. We have seen the end of the period of high prices which contributed greatly to inflame labour opinion against the social system and all that pertained to it. We mention these points not in a critical spirit, fully recognising them as the aftermath of post-war problems born in an atmosphere of compromise. We have to remind ourselves of these facts to convince us that the workman is not drifting into a state of moral chaos and anarchy, as so many people imagined. It has been a period of shifting values, and to us it is a matter for congratulation that we have traversed so much of the return journey, not without suffering, certainly, but without serious trouble. It is in this fact that we take courage for the coming year.

It may have been beyond the powers of any man to steer a course for us, and it is significant that everyone from the Premier to the workman failed to read the signs of the weather. The Chancellor of the Exchequer, who has now to refund millions of pounds of Excess Profits Tax, was as much in the dark as the leaders of industry who tried to prevail upon him to cancel the tax, and manufacturers and employers had no more knowledge to guide them than the workman, who, having increased his wage, altered his outlook and reduced his hours and his output. We have been taught many lessons in a short period, and again we see in this a hopeful outlook for the future. To be perfectly frank we are all looking for a message of encouragement; we would like to believe that prices have reached bedrock and that we may now expect the return of good trade. We believe that a hopeful outlook would be welcomed merely as an expression of optimism which need have no relation to knowledge. Yet it has been obvious during the past year that we do not get good trade by assuming a feeling of confidence ourselves and preaching it to others. Never in our existence has there been such an outpouring of information and advice upon the economic conditions affecting us during the past few years, yet the steady march of trade depression has been as inexorable as fate.

It is now evident that the question of good trade depends upon which of the following theories is correct: Either that we have reached the point at which prices will stabilise as a permanent basis, or that prices must eventually react to the pre-war basis. If the latter theory is correct, previous experience has shown that the process will come of its volition, and that if we attempt to prevent it we only arrest the course for a little, and, further, by maintaining prices we prolong the agony of the period of depression. It is questionable whether the solution is in our hands. If we believed that we had been suffering from a fever and that eventually our normal health would be restored we would have no difficulty in clearing our minds about optimism and pessimism. If we were asked whether the fever had yet abated the answer would be that the indication would be the return of good trade. We are inclined to agree with the opinion expressed by Mr. Smethurst that it is doubtful whether the coming year will see the complete return of good trade. Prosperity in the building industry is dependent upon a revival in other industries, and there is no evidence to show that any general improvement has taken place.

Mr. Gilbert Fraser's comments upon the number of architectural students and the already overcrowded profession will be read with serious misgivings. A high standard of architecture can never be reached and maintained unless reasonable prospects can be held out to students, and it is becoming imperative that something should be done to legalise the professional status of the architect. Mr. Portsmouth describes the unhappy lot of architects since the beginning of the war, and we have little doubt that the whole profession will agree with him. There is little for architects to do when trade is bad, and we would suggest that in the coming year they should think more about the position of the architect than in worrying about the state of trade. During the war architects' services individually and collectively were miserably recognised, and the Government carried out a huge building programme on the principle that anyone was capable of designing and controlling buildings. We believe this to be a vulnerable point which upon investigation might lead to something being done which would be of service to architects in strengthening their position.



Entrance to Music Room, Shallow Brook Farm, Mount Kisco, New York.
MR. B. W. MORRIS, Architect.
[This entrance was awarded the Gold Medal of the Architectural League in 1918.

Regarding the building trade, we hope if prices of building have to come down that the workman will see his position clearly. We do not blame him for his past outlook, but it must be understood that his holiday is ended. When prosperity was to be had easily he had at least an easy time if he was not prosperous. There is no need to ridicule his folly in believing that his theories of work restriction would result in perpetual prosperity, but he must now believe that no longer will the client pay for work which has taken twice the time to execute at twice the rate of pay. It is our sincere wish that the workman or his leaders will appreciate the position so that the grim spectre of unemployment will not fall upon the building trade.

Reference has been made in the correspondence to the high cost of manufactured goods for building purposes, but we believe that this is a matter which will automatically settle itself, as the huge demand of the past few years becomes balanced by a supply which will be greater than the demand.

We do not think that 1922 will be an exceptionally good year, but we think that the most important problem for the architect will be the future status of the architect, and for the builder his relations with his workmen. A satisfactory solution to these two problems during this year would bring prosperity nearer to architects and the building industry.

The following are contributions on the

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subject by presidents of several architectural societies :—

Manchester Area.

FROM MR. A. W. HENNINGS
(*President, Manchester Society of Architects*).

What are the prospects of the building industry in the Manchester district for the New Year? This is a very hard question and difficult to answer, there being so many factors to take into consideration, but after giving much thought to it and holding many conversations with colleagues and business friends the most important matters that will affect it can be reduced to five, viz: money, coal, cotton, labour, and materials. Any one of these items will materially affect building in this neighbourhood.

Taking them in the order named, the first, money, is a factor that has to be considered in business of all kinds throughout the country, but particularly in the staple trade of cotton spinning and its branches, the turnover being normally so great that without generous help from the banks it would be impossible to carry on the work, and when the latter is plentiful and good there is no difficulty in this respect. But heavy wages, costly materials, and still heavier taxation and rating have so increased the cost of production that business has shrunk to an alarming extent—the burden being too great for the industry to bear. The first need is to reduce the taxation and local rating, and until this is done, trade revival will be slight.

The second item is coal. All industries have been troubled with the high cost of coal, but it will be easily realised that this is so by comparing figures. Before the war good coal for raising steam was supplied at an average price of 15s. per ton. The war and the labour troubles with the miners brought this up to 52s., and now it is about 28s., and not of such good quality as before and therefore cannot raise so much steam per ton. An ordinary 100,000-spindle mill will consume about 5,000 tons per year when working full time, so that an extra £1 per ton puts a very heavy increase on the working expenses, all of which has to be borne by the price of the finished article. Cheap coal is vital to the staple industry.

After coal is cotton. Here again a cheap and plentiful supply is necessary. The smaller the crop the greater chance there is for the speculator, and as the greatest part of our supply comes from the United States the ordinary man will at once realise that the very active American does not let such an opportunity slip by. The 1921 crop turned out better than was anticipated, being in the neighbourhood of nine million bales, and this, with the balance left over from last year and the supply from other sources, ensures enough of the raw material for an average year—the world's consumption being somewhere about 20,000,000 bales. With increasing population and a growing home consumption the States will want more for itself every year, and everything points to the necessity for growing cotton in our own Dominions; but although this matter has been talked about for many years, little has been done to prevent a serious difficulty in the future.

Labour is the next point to consider. So far as the cotton industry is concerned labour has a habit of adjusting itself to ever-changing conditions, but for our purposes all labour has to be taken into account—miners, steel and iron producers, engineers, founders, and the like are beginning to see that short hours and high wages are incompatible with steady employment, and consequently the last few months of 1921 show a decline in rate of pay and an increase in output. Constructional steel has declined more than 50 per cent. from its highest rate, a most important item in mill and factory construction. An average mill of the capacity before mentioned requires about 500 tons of this article, and a high price for it is an absolute deterrent of building. Other trades, particularly the bricklayer, have had a great time, but here again the short hours and high wages have stopped many building schemes. It is only natural that business folk requiring structures should decline to pay such rates for so little work, and they are not to be blamed if they manage with what they have got and refuse to push business if the handicap of building is so great. Speculative extensions of business premises are the very life blood of the building industry, for if men built for sheer necessity only there would not be enough work to go round either for architects, contractors, or craftsmen.

Last of all comes materials. Upon this point there is a general opinion that the cost has been artificially kept up by means of combinations. Some of us feel very strongly about it, and look upon these associations as a means of extracting high prices from the consumer, and, indeed, the result of these arrangements has always been an increase of price against the purchaser. Bricks, for instance, at 80s. per thousand, are four times the price they were before the war, and this, added to dear labour and short production, has increased the price of brickwork per yard super one brick thick (the usual way of pricing in the north) from 4s. per yard to 21s. 6d—over five times previous rates. From these remarks it will be clear that a lowering of the price of materials is necessary if business is to expand.

Having thus considered the various factors that affect the answer to the question asked, it remains to summarise them and so attempt to foresee what will be the prospects this year.

Taxation promises to be reduced, the burden of E.P.D. has gone, and thus more capital will be released for extension of business.

Coal-getting is nearing the normal, and as we may expect cheaper food the miners' wages will be lower. Coal will therefore be cheaper.

Cotton is practically assured, labour is on the down grade, and in spite of combinations of producers materials are beginning to get cheaper.

From all this I consider there is every prospect of a revival of building operations in this district, slowly and in industrial structures first, afterwards in domestic work, but little prospect of those official and municipal buildings so dearly loved by the competitive architect until employment has become normally general and rating has been reduced from its present maniacal state to something like sanity.

Liverpool Area.

FROM MR. GILBERT FRASER
(*President, Liverpool Architectural Society*).

The prospects for architects and the building industry in the coming year are none too bright. The north-west province of Lancashire is just as likely to feel the shortage of work in the building industry as the other parts of the country. At the completion of the war a great number of architectural students took advantage of the Government grant to study at the schools of architecture, and 1922 will see most of these young architects in the ranks of the already overcrowded profession. The small work that has for so long helped the profession through all difficult financial periods in the past, such as small houses, churches, hospitals, &c., is not likely to be revived for some time, and the demand for industrial and office buildings has become much easier, due, no doubt, to the general cutting down process in all enterprises. It is difficult to see that school building will be restarted. There did appear to be some signs of temporary school buildings being erected to help out the education authorities, but even this class of work has had a decided setback. The hiatus in all classes of building operations other than those required for war services during the past seven years has left the country in a backward condition that can only be remedied by a revival in building works greater than that of the early Victorian era.

South Wales.

FROM MR. HENRY C. PORTSMOUTH
(*President, South Wales Institute of Architects*).

It may appear a simple matter to express an opinion upon the prospects of architects and the building industry in South Wales during the coming year, but when one starts to consider the question carefully one is not very much inclined to indulge in prophecy. The rôle of prophet is in rather bad odour after the sad experience of the past few years, and he would be a foolish person who tried to emulate those omniscient beings who used to foretell the progress of the war and the date of its termination. They rose, they lived their little day, and they sank from sight under the load of those events which they had forgotten to predict.

And yet, without posing as a prophet, it may be of interest if I give a brief survey of the position of the architectural profession as comprised in the South Wales Institute of Architects. The area covered by this body is of the most diverse character, both geographically and commercially, comprising as it does on the one hand the industrial districts of Glamorganshire and Monmouthshire, with their teeming population, and on the other hand purely agricultural counties such as Pembrokeshire, Cardiganshire, and Radnorshire. The conditions of the building industry which affect one part of the area might not operate with the same force in other parts, so that it is necessary to take a broad outlook in dealing with the subject generally.

There is no doubt that South Wales architects have suffered as much as those in any part of the country from the knock-out blow to the profession caused by the war. They were just recovering to some extent, and a certain amount of building work was being put in hand in spite of its high cost, when the so-called "Luxury Building Act" again falsified their hopes, and caused the postponement of many schemes and the total abandonment of others. I do not think sufficient attention has been drawn to the serious injury which this restrictive Act did to the building industry, more particularly in provincial centres, where the Committees appointed to exercise the powers conferred under the Act did not always exhibit a wise discrimination. A great deal of work was in the hands of architects when its blighting influence first began to be felt, and this work would largely have been carried out if no impediment had been placed in the way. When, however, the restrictions were removed, the condition of the country, owing to the slump in trade, was very different, and clients were inclined to be more cautious and to reduce their capital outlay to the lowest minimum. Not only was that the case, but there was another deterrent in the fact that building costs still kept at a very high level, and the prudent business man naturally decided to postpone his contemplated building until either the costs came down or improved economic conditions in the country would justify him in proceeding. If all the building schemes which were projected after the Armistice, and which now repose in the plan drawers of South Wales architects' offices, had been translated into actual buildings there would have been an extremely busy time for architects, builders, and workmen.

There are three things which the experience of recent years has taught the architect to cultivate in order to avoid sinking into a premature grave through the disappointments which have constantly beset him. These are forgetfulness of the past, confidence in the present, and hope for the future. It may be that his confidence and hope will receive some reward during the coming year. One is reluctant to be too optimistic, and yet optimism is at all times preferable to pessimism, even though the grounds upon which it is based are not very substantial. It is difficult to obtain a consensus of opinion of those in this district who are in a position to gauge the prospects of commerce in the near future. A great deal depends upon the temperament of the person who is interviewed, and it is possible to obtain totally divergent views upon the matter.

So far as my observation goes in the Cardiff and Swansea districts there are distinct signs of a revival in trade, although one is almost afraid to mention it in case it should take fright. A "certain liveliness" is visible in quarters which have hitherto appeared to be dead. An improvement in the general trade of the district, combined with a better political outlook, is bound to react upon the building industry. Those who have been holding back through lack of confidence will be encouraged again to take up their schemes and projects, and see if they cannot carry them through. Building costs

have dropped to a considerable extent, although they are still much higher than there is any occasion for. Manufactured goods are very slow in responding to the reduction in the price of the raw materials, and the powerful combines are still able to maintain high prices for their specialities. It is, however, doubtful whether they will be able to hold out much longer, in view of the restive state of some members. Wages have been reduced, but are still in some cases 200 per cent. over the pre-war rate.

A great many of the projected schemes have been waiting to be carried out for some years, and are really necessary to provide for the proper growth of the business with which they are connected. It is possible that the lower tenders which can now be obtained will be a sufficient inducement to allow of their being proceeded with. In other cases the promoters will wait until they think building costs have reached their lowest level.

Whatever happens, both architects and builders may take this consolation to themselves, namely, that the coming year cannot be worse than some of the years they have passed through recently, and there is every prospect that it may be considerably better.

South Yorkshire Area.

FROM MR. CHAS. B. FLOCKTON
(*President, Sheffield, South Yorkshire, and District Society of Architects and Surveyors*).

The present severe stagnation in the building trade and its allied trades has, in my opinion, largely arisen because all parties connected therewith have not in recent years given value for money received. Builders' profits have been abnormal and workmen's wages have exceeded the value of their output, and the great and rapid fluctuation in the cost of materials and the uncertainty of labour have made it impossible to make contracts for a fixed price or to give any undertaking to complete the work within a reasonable time. Consequently, a building owner could not tell what his building was going to cost him or how long his business would be disorganised by any alteration or extension of his business premises. No material improvement can be expected until this state of affairs is altered, but I know that two years or less ago architects in this district had received instructions for very many thousands of pounds' worth of work, sufficient to keep the trades fully employed for some years to come, and in many instances working drawings were prepared, quantities got out, and tenders obtained: practically the whole of this work was stopped by the state of affairs previously mentioned. Much of the proposed work is essential to the general trade revival of the country.

The district is crammed full of architectural and builders' work which only awaits settled conditions and reasonable prices. I am inclined to think that the bottom has been reached, and that the prospect is a little more hopeful because the contractors exhibit an inclination to accept fixed contracts at more reasonable prices, and the output of those workmen who are fortunate enough to be employed is on the up grade. These are indications that some measure of sanity at least is returning.

Berks, Bucks, and Oxon.

FROM MR. EDWARD P. WARREN
(*President, Berks, Bucks, and Oxon A.A*).

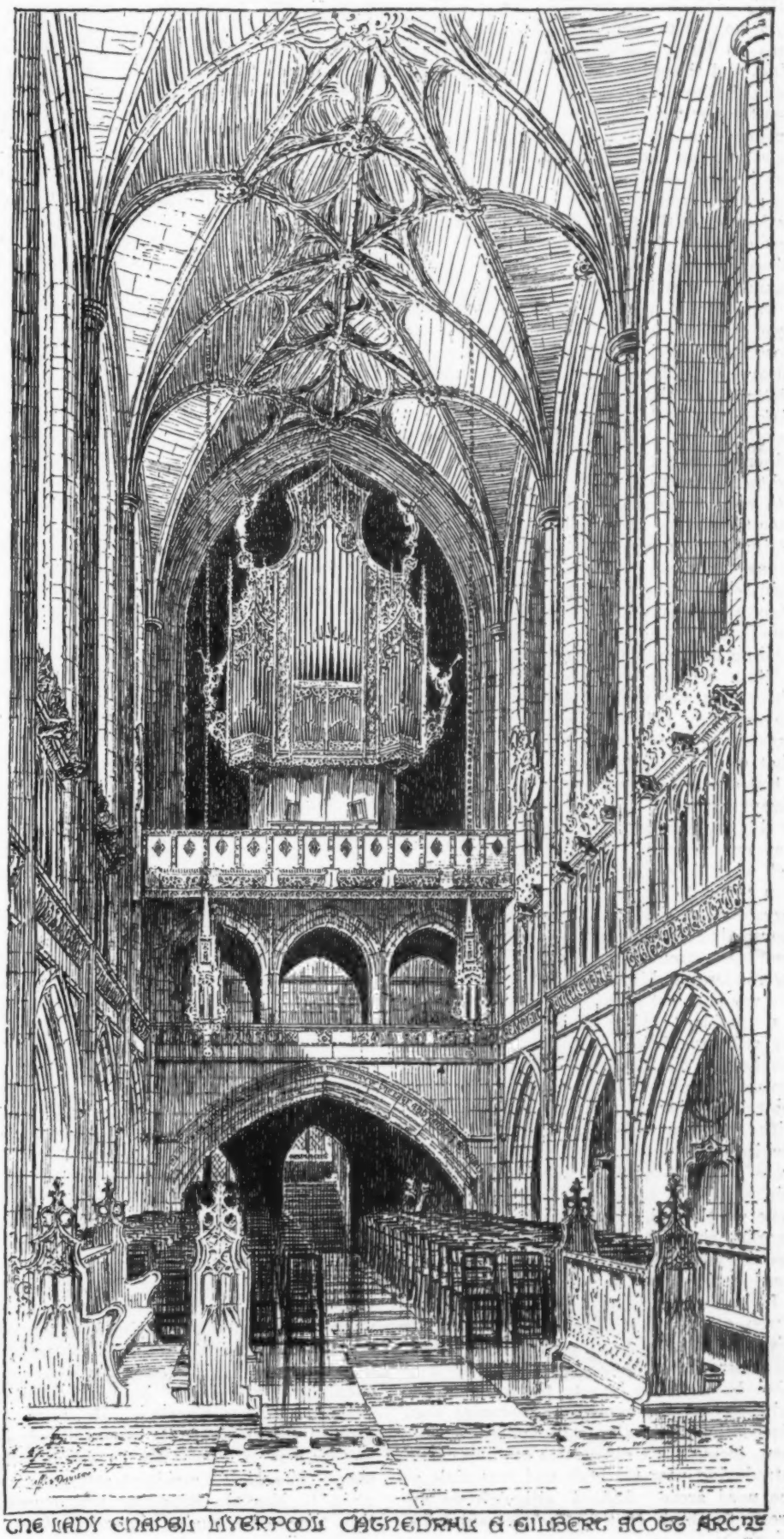
So far as I am aware, the conditions in the three counties of Berks, Bucks, and Oxfordshire differ little, if at all, from those prevailing in the south of England generally, as regards the prospects of building. Many people have the impression that building prices will fall early in the year, and for that reason, and also because of the winter which is now upon us, are inclined to postpone the serious consideration of building. I am bound to say, however, that I think a more hopeful feeling is increasing, and that the prospects generally throughout the southern counties are better for 1922 than they were at the beginning of the past year.

Northamptonshire.

A well-known architect in this area writes:—

There is not much work being done in this district, and no immediate prospect of improvement. But there is no doubt that the cost of building is coming down, and with lower prices work will certainly increase. Plasterers are scarce, and the delay in their work is so serious that architects are adopting, where feasible, some substitute for plaster in covering walls. This is a small matter in itself, but it is a symptom which those concerned would do well to take into consideration. Willing service even if interrupted, preserves friendly relations; but vexatious restrictions impel people to seek relief which, when found, is detrimental to those who impose the restrictions. The coal strike gave an enormous impetus to the adoption of oil-fuel, and the railway strike to motor transport.

[Some interesting views on the future of the building industry from the points of view of the builder and the operative are given on pp. 7, 53 and 54.]



THE LADY CHAPEL LIVERPOOL CATHEDRAL G. GILBERT SCOTT ARCHT

HISTORICAL BUILDING CONSTRUCTION.

BY MARTIN S. BRIGGS, F.R.I.B.A.

I.—INTRODUCTION.

AN extraordinary feature of modern architectural criticism is the supposed conflict between tradition, construction and style. This seems to be our "eternal triangle"; but, as has been very well proved in recent articles in this journal, it is utterly ridiculous. Tradition, paradoxical as it may seem, was never hostile to new ideas so long as architecture was a live thing, and there is no reason why tradition should be hostile to reinforced concrete, or even to patent glazing. When the fifteenth-century masons succeeded in building their first fan-vault one may imagine that they boasted of the novelty of their invention; they would not try to justify it by a reference to the tradition of the Normans. And even in the times of the early Renaissance that followed, when details of ornament were imported from Italy much as millinery is now imported by aeroplane from the Rue de la Paix to Dover-street, those self-conscious borrowings from the antique were hailed, among architectural *dilettanti*, as the *dernier cri*. It was the misfortune of the later Renaissance that there was no constructional stimulus to influence design, but the exquisites of the eighteenth century took care to be up-to-date even when most pedantic. It is only since the Gothic revival that it has become a crime to be modern. Dragged at the tail of one "revival" after another, critics of architecture have to change their coats as often as a chameleon, and they have no time left to evolve a natural manner of building to meet modern conditions. That is left to architects who have no time to be critics, and who are too much worried with the erecting of utilitarian factories or starveling Government cottages to know what critics have to say about style.

But as architectural style in the past has always reflected the spirit of its age, and as this is, perforce, a commercial age, we may expect to find that the new style, if and when it comes, will be first revealed in a type of building that is really necessary, rather than in vast palaces where thousands of Government officials toast their toes around the fire. The problem for modern architects is not to select—as one would select an antique chair in a shop—a suitable "style" with which to plaster the exteriors of their buildings, but to make the best of the present curious mixture of limited opportunity and limitless choice of material. There is no need for any break with tradition in doing this. When all architects have accepted reinforced concrete and plate-glass as inevitable for certain buildings, style will follow, as it has done all through the ages. There was no yawning chasm between style and construction in the past; there need be none now. Good architecture includes both.

It is because of this imaginary rift between construction, design, and tradition that the articles which will shortly follow this Introduction have been written. The more one tries to fathom the mind of the old builders the more one becomes convinced that they were sane and reasonable men, facing their difficulties as they came, introducing new methods and materials as the need arose. Indeed, although we are prone to think of them as untrammelled artists and of ourselves as the victims of a commercial tyranny, almost the reverse is the case. They, too, worked for their bread and butter; but they were more concerned with the handling of material than with drawing on paper. They knew nothing, it is to be feared, of "rendering" or of "*esquisses-esquisses*," or of any of the other devices of modern architectural draughtsmen. They were perhaps less hustled than a modern architect, but many of the most popular jokes of to-day are based on the slowness of the modern bricklayer and the slackness of the official who supervises his work. The success of the mediæval craftsmen was due partly to the simplicity of their methods and to the comparative ease with which knowledge of a trade could be acquired. The men of the past had few temptations to play tricks with material, because their materials were few in number and scarce in quantity. Life was altogether more simple in those days.

Modern conditions cannot possibly permit of a return to such circumstances. It is impossible to ignore machinery, rail transport, trade unionism, and all the other factors that have changed our life. Construction is a vital matter to every architect (not an optional "subject" at an art school), but it does not follow that he must therefore build with his own hands, eat off an adzed-oak table, eschew electricity, and cultivate a pseudo-mediæval appearance. A Tudor craftsman who aped either the manners or methods of his Norman forefathers would be regarded in his own day as a lunatic. So it is possible to produce good work even with the aid of machinery. There is everywhere at the present moment a sad lack of enthusiasm for his craft on the part of the worker, and machine-work cannot have the same attraction as hand-work. It gives no scope for individuality and little for emulation. But machine-work, like commercialism and trade unionism and electric power, has come to stay. We cannot escape it by waiting for the good old times to return. Rather must we face it with the courage and the enterprise of the ancient builders, whose minds were receptive and not retrospective.

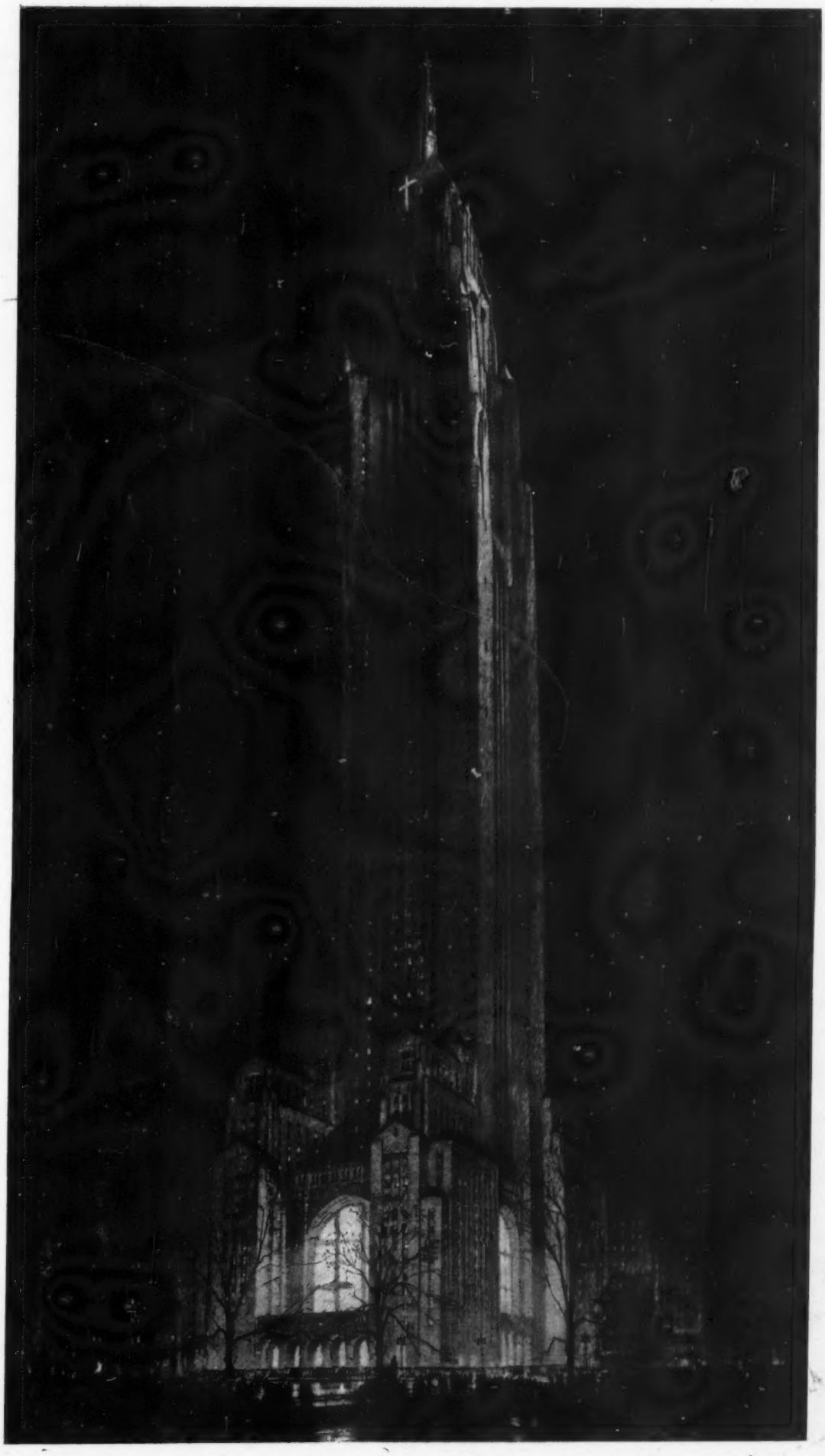
Nowadays the architect must be a sedentary worker. Social and economic conditions chain him to his drawing-board, his telephone, his files, and his office. That the public recognises. Yet his clients, and the far larger number of people who should be his clients but are not, expect an architect to be something more than a draughtsman. If he dresses like an artist or an organ-grinder he may capture the hearts of a few susceptible old ladies with money to spend on ingle-nooks and the like; but dressed as an organ-grinder he will never attract the ordinary man, who in these hard times demands of his architect a thorough mastery of building methods, expects him to be able to build with economy of material, and with the latest material when the latest is the best. He knows nothing of the battle between tradition, design, and construction. He wants an attractive and well-built house, an efficient factory, or a reasonable and up-to-date shop. Should his architect attempt to explain to him the appalling seriousness of this "eternal triangle" in architecture, he would fail to see why it should exist at all.

So while English architects are losing work—to engineers on the one hand and to jerry-builders on the other—through their ostrich-like tactics in these petty disputes that nobody outside the profession cares two straws about, the time is ripe for a study of the building methods of those good old times, when—according to some writers—the builder could do no wrong. We shall find that the "modernism" that Professor Lethaby has pleaded for so admirably in *The Builder* is in no way inimical to the modernist spirit that always actuated builders in the past, that tradition and style followed from constructional developments as new materials and methods were discovered. The super-men of architecture in the past, so far as we know their names, were versatile and all-round men. Many of them were great draughtsmen, but with draughtsmanship they combined urbanity (in its true sense, *i.e.*, an understanding of the other man's point of view), technical knowledge, and common sense.

Building construction is apt to be thought a dull subject. It is difficult to raise any enthusiasm among architectural students by describing the composition of cement or the nature of a joggle-joint. But building construction should not be regarded as hostile to the history of architecture or to the theory of design. It is so interwoven with them that only in an over-specialised age could such an arbitrary division be imagined. So long as architects and self-constituted critics of architecture go about the country preaching that all modern architecture is bad, so long will they continue to foul their own nest, and so long will their own hearers think that modern building construction must be a dull affair. But when we put aside these ridiculous distinctions we find that the history of architecture and the history of building construction are one and the same, that tradition moved forward as construction developed, and that style followed tradition.

In these articles we shall neglect the greater aspects of construction—the evolution of arches, vaults, domes, buttresses, and tracery—concentrating on the minor details and processes that seem more akin to our own work to-day. Few of us will ever have to vault a great cathedral or build a great palace of marble. But most of us even now are struggling with the details of cottages and small buildings, affording little scope for Design with a big D. In studying historical architecture thus with a microscope, so to speak, we can learn from it how the old builders faced the same difficulties that confront us to-day, and we shall find that the windy warfare between tradition, construction, and style is only an imaginary conflict after all.

In each of the ten subsequent illustrated articles (dealing respectively with Brickwork, Masonry, Concrete and Marble, Carpentry, Joinery, Ironwork, Roofing, Plasterwork, Leadwork and Glazing) one branch of construction will be traced from the source of all Western architecture in Ancient Egypt, through classical times, the Middle Ages, and the Renaissance, up to the end of the eighteenth century. There are long periods when certain branches of construction were unknown or neglected. There are other branches, such as masonry, which it is impossible to treat adequately here, where stress will be laid on minor details rather than on monumental building.



Convocation and Office Building for Protestant Centralised Religious Activities, U.S.A.

MR. BERTRAM G. GOODHUE, Architect.

MEDIÆVAL FREEDOM.

BY REGINALD HALLWARD.

I.—Introductory.

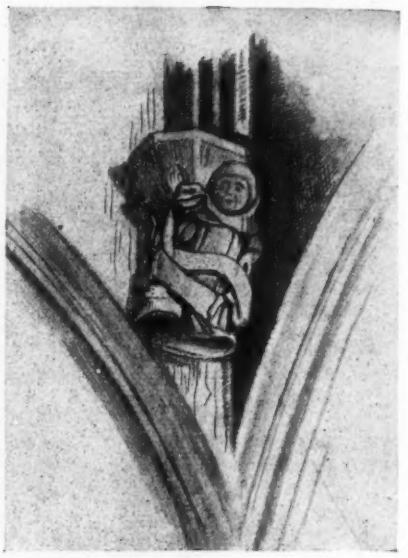
MEDIÆVAL freedom—what was it? Was it a dream? Yes, indeed; and a dream in which they believed. They believed in their dream and the dream came true in their work. They lived in their dream because within it lay their hearts' desire. Art was still religion. (Am I preaching the old sentimental mediævalisms?) They gave the form to their dream which was theirs to give. We have to give form to our own. The Gothic revival gave us not even the shadow of the dream, only the shadow's shadow. The Oxford movement perpetuated the fable, not the faith, and as doctrine and measurements can inspire no vision—mistaking the visible effects for the causes—so have we left the cause, which is the link of tradition, to perish until the dream has faded, flickered and expired.

I had been resting on the soft wayside grass watching the patterns made by the ash leaves above me against the blue of the wide and radiant sky, and the village was still some way off. In these sultry August days, how well we enjoy, after miles of hot sun and dusty road, the sense of approaching a village! That dark mass of sheltering trees seen on the horizon—though I do believe that the dusty road would fain have us believe that it was not so—means more than fields, which a grey stone gable visible amidst the distant elms confirms. Approaching nearer, the road turns down by a bend in the hill, when there comes into view the outskirts of the village itself, a few scattered cottages and the fragrance of oak fires. Entering the street we reach the "Swan" Inn, and a little way up the road appear the clustered gables of the Manor House and gaunt stone tower of the church; and so by high walls, yew hedges and towering elms we reach the old stone bridge which cattle are leisurely crossing. How I like the pace of cows and draught horses—their tails swinging from side to side, as though beating time with all Nature in rhythmic unison. It is all so seemly by the side of the smell and noise of racing motor-cars, and I prefer to be left with them to "loaf and invite my soul." I think the tension and energy of the war left this legacy of restlessness behind it—this impulse to fly from wherever we are—and as I watch the motor-cars disappear one after the other, whirled along in their own dust, I feel the august significance of slowness, the spiritual awakening of rest.

Architecture is the crown of this countryside, as perhaps it is of any other. It is almost as much a part of Nature here as are the noble trees. It sets its strong protecting arms around us, and gives to this wide landscape just that accent of withdrawnness and romance we find in cliffs and hills. The old owl-haunted elms compete hard with it, and I expect they have understood each other pretty well; the large hearts of these old builders were very near to Nature, for their work creates much the same impression. I look up into the recesses of these high elms which tower above the buildings, forming abysses of cloistered shade and overhanging precipice, and find within them the same withdrawnness, the shadow of the same mystery, and dependence on the unknown. The buildings here are on the whole actually small, but such is their inspiration that they hold the impressiveness and mystery of all wonderful natural things. Life does not blow itself out here to

compete with what is greater than itself, but shelters trustfully under it. I rather fancy that building, before it became detached from life which is so little reflected in it, and entangled its simpler issues in a confusion of tongues, textbooks, and styles, hardly knew itself as art at all, and I expect there was much less talk about it until it became "sicklied o'er" and self-conscious. Nothing speculative found much room for itself, because the mind was free from doubt, and the liberation which this includes emerges in beauty which is always at its goal. Results sprang naturally out of direct and legitimate needs and were the noble shadow of the life that kindled them. Though we now cover up our infidelities in all the cast wardrobe of the styles, it cannot hide them or conceal from us where our treasure really lies.

On one of my tramps I got into conversation with a villager near his allotment, and, knowing the neighbourhood well, he told me some facts about the local history. I learned through him of changes in the locality which have effected a decline in the conditions of village life and have cast a shadow over it which is reflected in its architecture as well. It was noticeable that a good many of the houses had suffered mutilation by alteration and subdivision, and from what my informant told me (he could remember his father giving him the particulars) many of these houses so divided had once been farms or smallholdings, owned by the inhabitants, and this change into tenements happened soon after the freeholds were acquired from them by



the larger landowners. So far as he could remember this happened about 1860. He told me in evidence of this that most of the fields round about the village were still known by the names of their former owners—"Martin's" field, "Leitch's" field, and so on. Whatever the cause, this change led to many of the houses falling into neglect, while others had been pulled down altogether. Social conditions react on architecture, because we are all members of one body. The village, in its fall from better conditions, brought down architecture with it. It might appear that the alternative now lies in the rich landowners' philanthropy, on the self-conscious model village. Those that I have seen, however, remind me that the imitation of local character is no alternative to local character itself, and that there is a poverty in any single mind which cannot compare with the wealth of the building which is once more a natural growth out of the lives of the people, and woven out of their dreams.

The advantage of a time of solitude and acquaintance with the countryside, especially when spent in a neighbourhood wherein the architecture of mediæval England still retains its hold, is in the impression it conveys of the difference between the new and the old, the evidence of the dislocation which the broken link of tradition has entailed. This relation between them, fundamental to our understanding of either, or of ourselves, was missed by the Gothic revival, and perhaps has never been

intelligible in any movement since. The protagonists of method, of reforms, of authority and tradition, too often speak in a language they do not themselves understand, and therefore their diagnosis is unaided by any psychology penetrating enough to unravel it. And yet, wandering amongst these hamlets and small country towns, it proclaims itself on every side. It proclaims itself through church and farm, cottage and out-building. Their forms seen in varying and perpetual transformation are yet tied and welded by an internal unity, which locks them all together, and the relation of the new to the old—of modern to mediæval building—can only be understood and restored by the recovery of this unity to itself. Our boasted eclecticism is a misunderstanding of the nature of variety, and is only a falling apart, and most of our appeal to authority and tradition is obscured by its paramount materialism. Yet authority, order and discipline are vertebrate through every stone of these old buildings, though a discipline of another kind and one of which we have lost sight of almost altogether.

Of the changes which such recovery promulgates we can do no more than glance at. One sees, however, how useless all remedies will be found until we return to ourselves. Nothing will explain the loss of beauty but the loss of belief, and nothing else will recover it. These old monkish masons believed in their dream, and the dream came true in their work. This is all manifest enough in the church here, and the carved ornament and detail is only a part of an ensemble which is all as natural as the trees and fields, and shares their incomparable beauty.

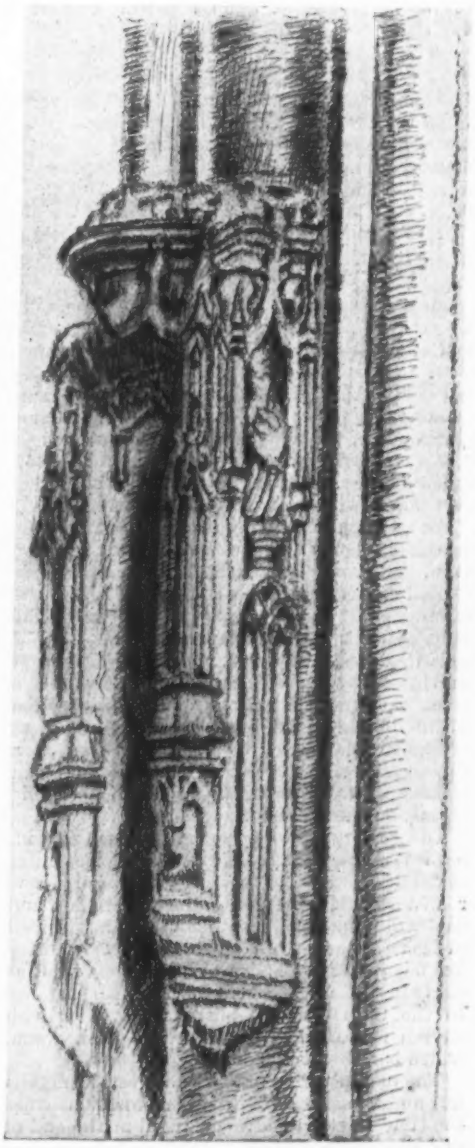
There are in the chancel of this church a number of stone corbels giving support to the roof beams, which are carved with various devices, the signs of the Evangelists, and I think the bishop and monks represented had to do with the building of the church, as there appears to be a mason's mallet in the hand of one of them. The little sketches in the text were made from them, and I am inclined to think that did not some evil genius in life separate the man so much from the natural contact with his work we could have results just as personal, vital, and beautiful at the present time. But what fine, careless rapture can inspire the mason who has the office drawing to carry out, far removed from the actual conditions governing the site, with no freedom, and no dream but political change to inspire him? I do not for one moment believe that these corbels took a long time to carve; on the contrary, like wall paintings—and they partake of the same nature—they were no doubt executed directly and boldly, as the situation and the aim inspired them. If only we could divert the students trained in the art schools from Academy sculpture and perch them on scaffolds where situation and right conditions would evoke inspiration, I believe we should get results of new and significant character, because they would have unloaded from their souls all the false standards of aim and finish which obstruct their activity. On one of the buttresses a stone is left here and there projecting in an untidy, arbitrary manner, and these stones are

carved to represent—one, a rascally Moor, an Infidel, and another a wicked man tearing out his beard. Full of humour and *joie de vivre*, they are, I am told, effigies of those denied entrance to holy church; so there they remain to this day. The exuberance of these masons breaks out again on one of the slender nave piers, which suffers an interruption of its graceful length through a stone projection representing a shrine whose carved and beautiful detail, though sadly mutilated, still remains to delight us with its loveliness.

On returning home, some few weeks later, I found myself looking at the stone corbels supporting the roof timbers in the church here, which leave the impression of a stick of rhubarb cut into pieces, and shared round. The stone was also disfigured by a moulding of the ugliest character, and I should think this had been done in the length and then sawn into the required number of pieces. One of the most significant facts of the pigeonholing of architecture has been its contraction from the corporate to the single mind (so poor an alternative) until we can find an architect to tell us that the failure of craftsmanship is not even to be regretted. This contraction back to the single mind of the universality of architecture is the opposite of true authority or tradition, and I prefer the master craftsman to the "mistress art." Nor is it what I mean when speaking of either authority or discipline, because neither depends on the suppression of that which it is intended to uphold, *i.e.*, the corporate well-being. Fortunately, there is a revolt from this manifesting itself and such authority is on its trial. The alternative stages towards a better interpretation will entail a "barbaric" period, as witnessed in painting at the present time, but it is a direct course towards extricating art from its false standards and bringing it back to its true ends, while the other leads only towards the factory system and the poverty of the single mind.

I have seen the work of disabled soldiers when left to themselves as "Gothic" and vital as possible, hardly differing from my carved stone of a "malignant and turbaned Turk" on the church here—much more akin to Gothic than anything the Gothicist's mind ever achieved. We have so much multiplied precedents that few dare to move outside of them. Uniformity has supplanted nature and invention, so that the wings of inspiration no longer bear us up. It is only in violating every canonical rule, spiking every established canon of taste, that we can make it possible to reach beauty, which my disabled soldier reached without any difficulty at all. Nor must I forget my valiant village glazier, who glazed the chancel windows of an ancient church in this neighbourhood some century ago. Undeterred by the problem of setting out his diamond quarries to fit his template, for which he was quite unequal, he actually adds a charm out of his own entanglements, and gives us glazing which is a pleasure to behold. I am not proposing to create a precedent or pleading for bad workmanship—my whole purpose is to protest against it.

The chancel of the church thus decorated by the prowess of my village glazier is seen from the nave through an opening formed by the massive archways of the central tower; beyond this dim corridor the chancel is seen bathed in light, its cool, delicious radiance beckoning as though from the threshold of another world. Saving a few quarries of ancient glass there are hardly any coloured windows, and the blue heavens and the green branches smile through them; I know of no light better for religion than this clear, virginal radiance bestowed by the sun and the open air. Was there ever any phrase more foolish than "the dim, religious light," as though there was only mystery in darkness and religion in a covert shadow? My feeling is—for the mystery of glass painting is still much in its infancy—that we shall rise to new interpretations other than that of loaded colour and darkened glass, and that it will some day take another form in which light shall not be excluded but made more lovely, in which its forms shall suggest more than the trees outside and yet not hide them. I see such windows combining all that is most lovely, a Bible once more, in light and shade and silvery white and stain, and the flash of colouring, amethyst, ruby, and lapis lazuli piercing its white firmament like stars.



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ILLUSTRATIONS.

"The Builder" Calendar for 1922.

Our calendar this year shows a view of one of the most important and successful developments of modern London. It will be generally agreed that the southern termination of Kingsway, as shown here, will not be an unworthy finish to one of our most important new thoroughfares. The terminations of the street on the east and west sides have recently been completed, and the central portion of the great Bush building is now being rapidly proceeded with to the designs of Messrs. Helmle & Corbett, of New York, Messrs. John Mowlem & Sons being the contractors.

School of Bio-Chemistry, Cambridge.

This building is now being erected for the Cambridge University School of Bio-Chemistry. The materials used are sand-faced bricks, Portland stone, and tiles to roof. The general contractors are William Saint, Ltd., of Cambridge, and the clerk of works, Mr. G. T. Murton.

The architect is Mr. Edwin Cooper, F.R.I.B.A.

Chelmsford Cathedral.

The proposal is to leave the ancient parts of the existing parish church intact and to build the Cathedral nave on the site of the existing north aisle and transept, which are about 50 years old. The old west tower will remain and a companion tower will be added at the north-west angle of the new nave; the ground story of this is to serve as a temporary chapter house, and a Cathedral library is planned above the west porch, which connects the two towers.

For structural and financial reasons it is considered out of the question to vault the new nave, &c., and the height of the interior is limited on account of the dimensions of the old tower. It is, therefore, proposed to have flat ceilings like St. Alban's Abbey, as this form of covering gives the greatest possible height of wall internally, and consequently, after vaulting, gives the greatest effect of lofty proportion within limited dimensions. The parochial effect of any interior which is covered with an open timber roof will thus be avoided. The problem, of course, is to get a cathedral effect in a building of only moderate scale.

The west front is at present very much shut in, but it is evident that in the future the necessities of traffic will lead to the construction of a new road across the west end of the churchyard, and this will admit of a small square being formed in front of the Cathedral. Therefore, attention has been paid to the design of the west front as likely in the future to form the principal entrance to the Cathedral, the entrance to the parish church remaining (as before) the south porch, which is rather a fine one.

The old church is of some interest, though it has undergone several drastic restorations since the time when the nave collapsed at the end of the eighteenth century. The most interesting internal feature is an arch on the north side of the chancel, divided into two sub-arches with a very slender pillar, the spandrels under the main arch being filled with open traceries. The tower is a fine one; the nave, rebuilt about 1800 in churchwarden Gothic, is not without a certain interest, and will be preserved under the new scheme. The chancel had a clerestory added in the 'seventies of the past century, and only the lower parts of the side walls here are ancient. The church generally has been expensively decorated in the past fifty years and it is not proposed to interfere with these features.

The architect for the new work is Sir Charles Nicholson, Bart., F.R.I.B.A.

Building for the London Assurance Corporation.

THIS building is now being erected from the designs of Messrs. Campbell, Jones, Son and Smithers, and was the outcome of a limited competition. It stands on a triangular site, which was complicated by questions of adjoining owners. The building is a steel-frame one, containing lower ground floor and two basements, the foundations being carried down to the blue clay. The front is of Portland stone. The building, which is of fire-proof construction throughout, has staircases and vaults in reinforced concrete under the pavement. The planning is on an axial line to get full advantage of the open area on the south, the entrance being at the principal corner and looking towards the Bank of England. The general contractors are Messrs. Trollope & Colls, Ltd., and the sub-contractors include: — Hot-water, heating and vacuum-cleaning, Wheeler & Sons; lifts, Marryat & Scott; steel framing, Redpath, Brown & Co.; art paving for mosaic floors and wall lining, and marble columns on ground floor, Art Pavements and Decorations, Ltd.; wells and water supply, C. Isler & Co.; electric lighting, Strode & Co., Ltd.; metal work, J. W. Singer & Sons, Ltd., and Ramsay & Co.; safe doors, Ratner Safe Co., Ltd.; metal fittings, Sankey-Sheldon.

Adelaide House.

In addition to the elevations in our inset illustrations of Adelaide House, London Bridge, we give on p. 31 a perspective view, from a drawing by Mr. T. S. Tait. Sir John J. Burnet, A.R.A., and Partners, are the architects.

Chapels at Chester Cathedral.

ST NICHOLAS'S CHAPEL.—This Chapel is situated in the south-east corner of the South Transept. The fitting up of the Chapel was undertaken in 1916 as a memorial to the late Canon Binney, and the work was completed in 1917. The treatment consists of altar and reredos, with panelling at each side; and also a marble floor and altar step. The altar, reredos, and panelling are in woodwork, and are coloured a soft grey, with portions of the mouldings and carving silvered. There are three sculptured panels in the reredos: the subject for the central panel being "The Crucifixion"; the left-hand panel represents "The Resurrection," and the right-hand panel "The Breaking of Bread." These three panels are decorated in colour. The pavement and steps are in black and white marble. On the riser of one of the steps is carved a dedicatory inscription.

The altar, reredos, and panelling were executed by Messrs. Watts & Co., Ltd., of 66, Baker-street, W. 1; and were decorated by Mr. G. Tosi, of 58, Beauchamp-place, S.W. Messrs. Watts & Co. also supplied the altar frontal. The marble pavement was carried out by Messrs. Farmer & Brindley, Ltd.

ST. GEORGE'S CHAPEL.—The fitting up of this Chapel, which adjoins St. Nicholas's Chapel, was undertaken in 1920, as a memorial to the officers and men of the Cheshire Regiment who lost their lives in the war. The work, which was completed in 1921, consists of an altar, retable, reredos (with a panelling at each side), the extension of the marble paving (a portion of which already existed), a Litany desk, and a shrine containing the Roll of Honour Book. The altar and retable are carried out in a toned white marble, and on the front of the altar is a panel of yellow marble, on which are carved angels holding a wreath. The reredos, which is of oak, is in the form of a triptych, and contains a large sculptured panel representing St. George and the Dragon. The panelling at each side of the altar and reredos is also of oak, and the Litany desk is of the same material. The shrine for the Roll of Honour Book is of stone, lined with oak, and having a gilded wrought-iron grille in front.

The marble altar, the extension of the marble paving, and the shrine for the Roll of Honour Book were carried out by Messrs. Farmer & Brindley, Ltd. The Roll of Honour Book was executed by Mr. Sidney H. Meteyard, of 57, Midland Buildings, 3, New-street, Birmingham. The whole of the woodwork was carried out by Messrs. Watts & Co., Ltd.

Structural repairs to the tower and north wall of the nave of the Cathedral are badly needed, and an appeal is being made to the public by the Dean for the sum of £20,000.

Both the Chapels were carried out from the designs of Mr. G. Gilbert Scott, A.R.A.

Buildings at Tilbury.

These buildings have been erected by the Port of London Authority for the housing of the police and firemen, the Fire Station being placed in the centre. The materials used are coarse-textured red brick with flush mortar joints, the roofs being covered with hand-made tiles. The general contractors for the works were Messrs. John Mowlem & Co., Ltd., the quantity surveyor was Mr. G. A. Webster, and the clerk of works was Mr. J. Fraser.

Mr. Edwin Cooper, F.R.I.B.A., is the architect.

The Pantheon, Rome.

The interior of this grand circular edifice has within the thickness of its massive wall seven recesses, or very large niches, of which the one facing the entrance (higher than the six others) and the two at right angles to its chord, are segmental on plan. The remaining four are also segmental, though in a very much less degree. As the rear wall of these conforms itself to, or is only part of, the main circular wall, the section so comparatively small barely escapes the straight line. In front of all but the highest niche is a screen, so to speak, of two beautiful columns, which help to support the drum. These niches contained formerly the effigies of the greater gods, and against the intermediate wall-spaces were pedestals supporting statues of lesser deities. Constantine carried away the sacred statues and the sculptured panels which adorned the drum to decorate his new capital. Pope Boniface IV, when he converted the Pantheon to the service of all the martyrs, placed eight altars where the pedestals had been, with altar-pieces adorned with smaller columns, pediments, &c. The recesses became chapels or burial places for the great.

In drawing one of these chapels, with a gleam of light from the central eye of the dome above slanting across the columns to relieve them against the dark background of the chapel, I have attempted to "restore" to some extent what was probably the effect of some of the sculptured panels of the drum.

The Palais de Justice, Paris.

The noble façade of this structure would seem to have a touch both of the Greek and the Egyptian in its inspiration, the Greek predominating. It is the work of Joseph Louis Duc, a distinguished exponent of the earlier nineteenth-century classic revival in France.

A. C. CONRADE.

Other Illustrations.

We also illustrate this week some typical work by Mr. Bertram G. Goodhue, of 2, West 47th-street, New York City; the Bush Terminal Building, New York, Messrs. Helmle & Corbett, architects; new premises in Berners-street, for Messrs. Bourne & Hollingsworth, Ltd., Messrs. John Slater & Keith, architects; twelve London shop fronts; and some progress views of large buildings now nearing completion in the City of London.

The Palais de Justice, Paris: Portion of Façade.

From a drawing by MR. A. C. CONRADE.

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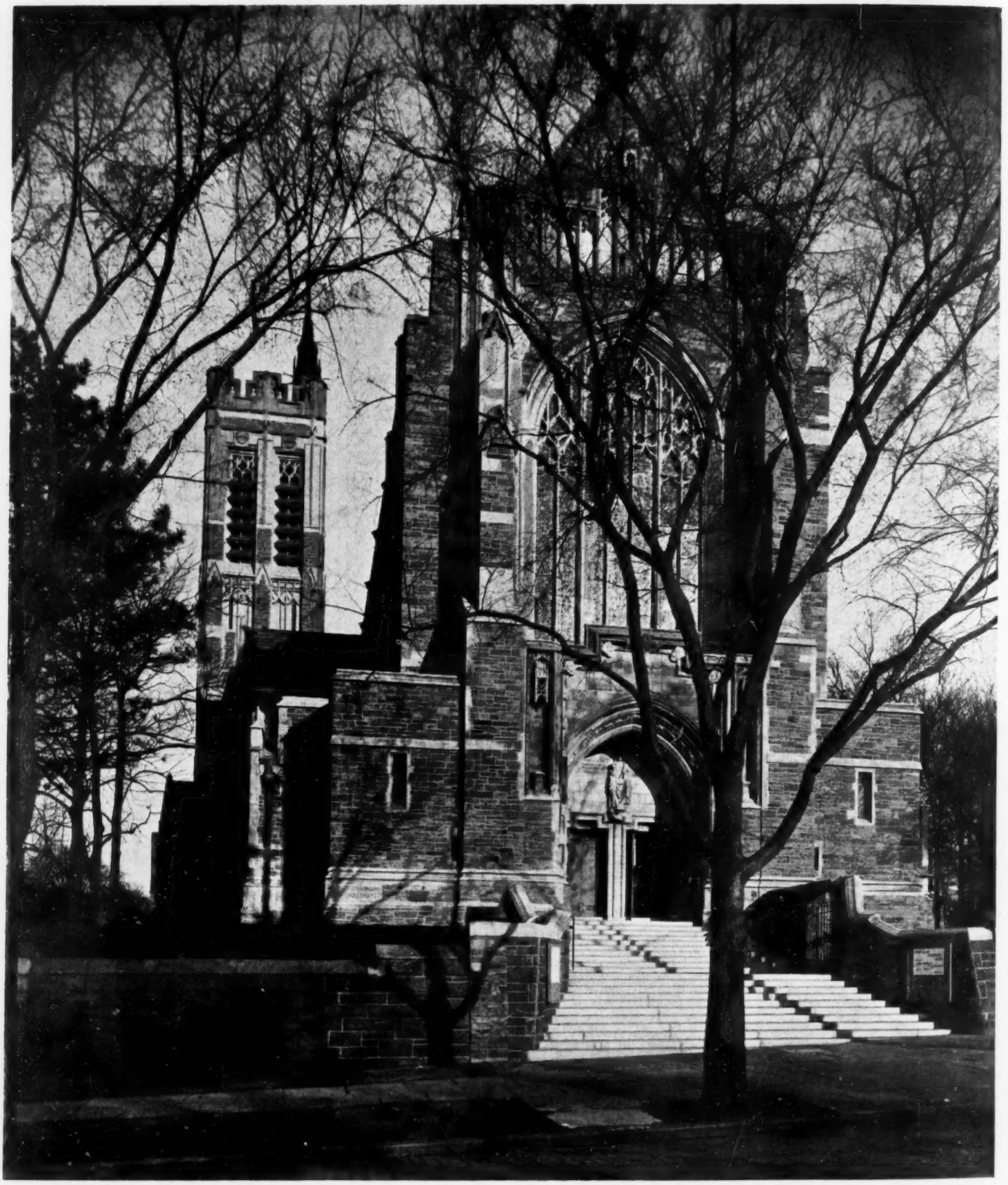


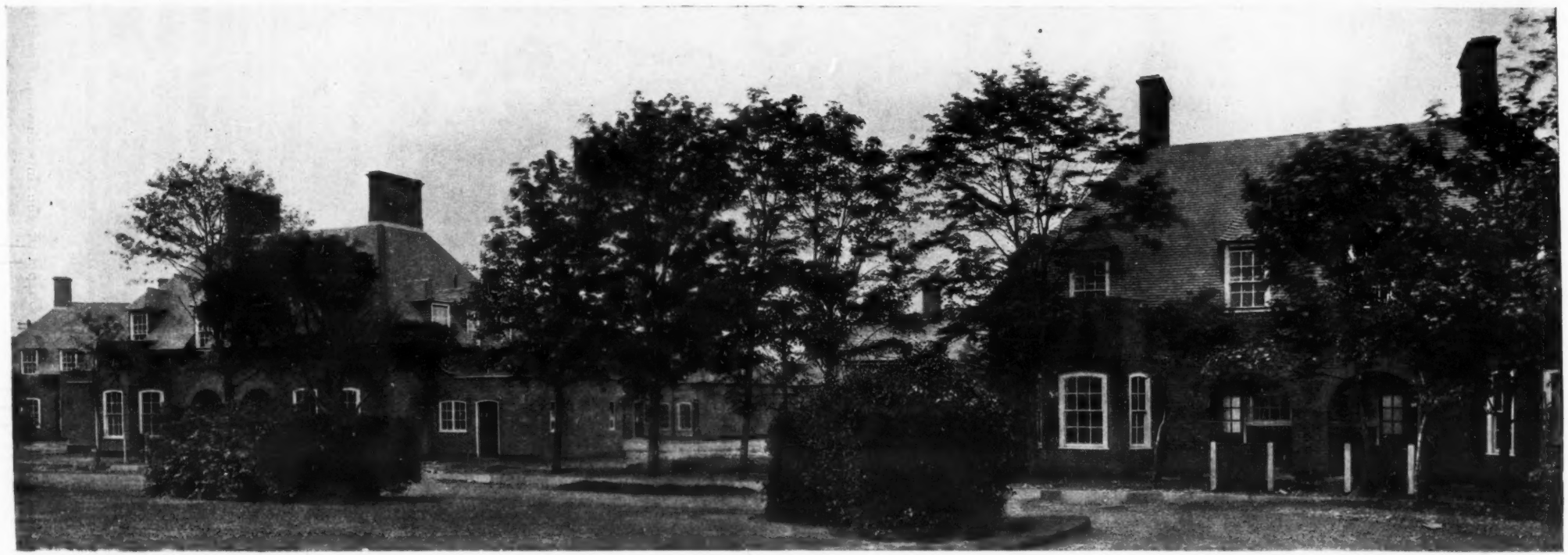
Chapel of the Intercession, Broadway and 155th Street, New York.

MR. BERTRAM G. GOODHUE, Architect.

Chapel of the Intercession, Broadway and 155th Street New York.

MR. BERTRAM G. GOODHUE, Architect.

THE FIRE STATION AND TWO FIREMEN'S HOUSES.



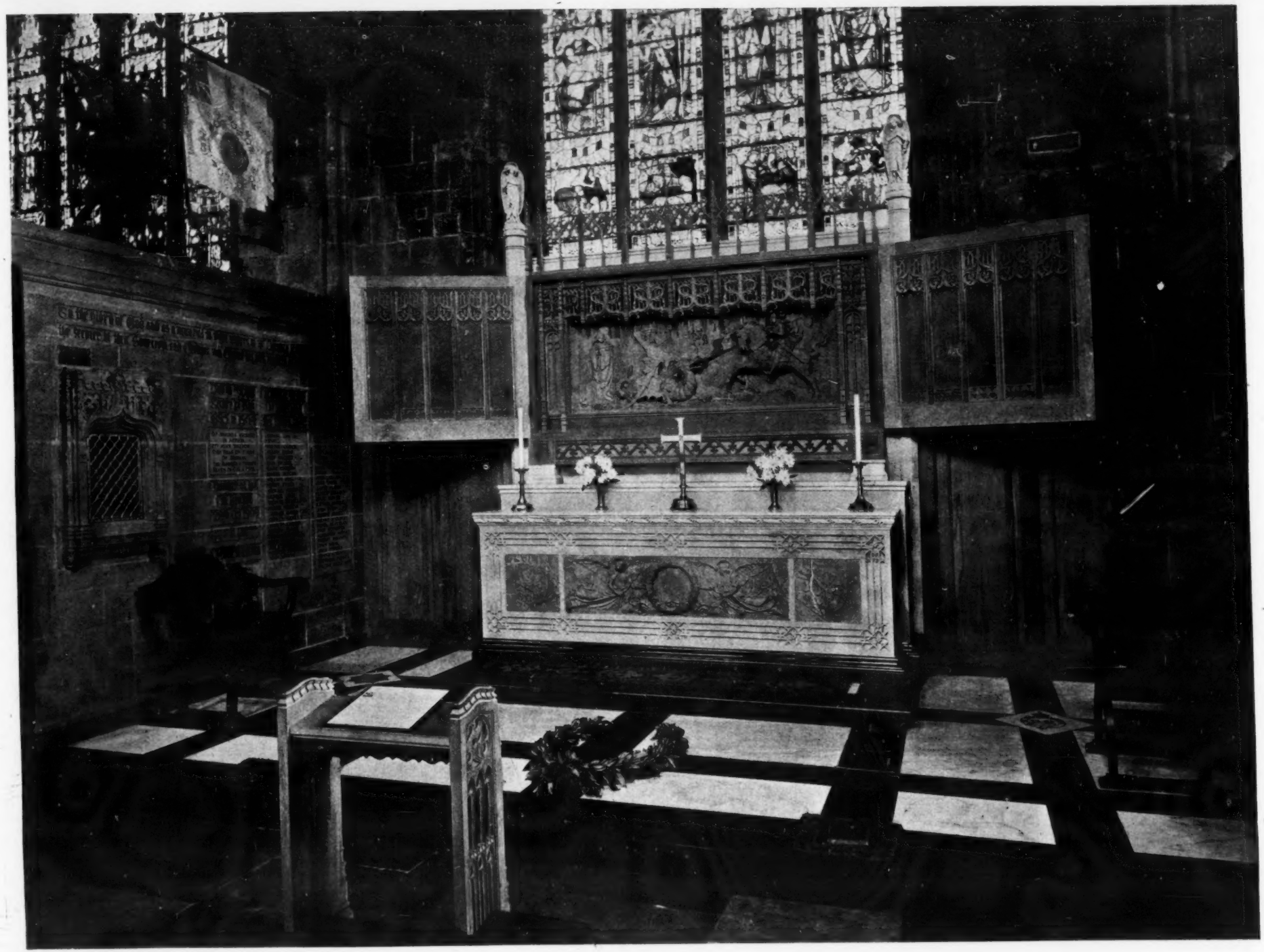
POLICE HOUSES.

Buildings at Tilbury, for the Port of London Authority. MR. EDWIN COOPER, F.R.I.B.A., Architect.

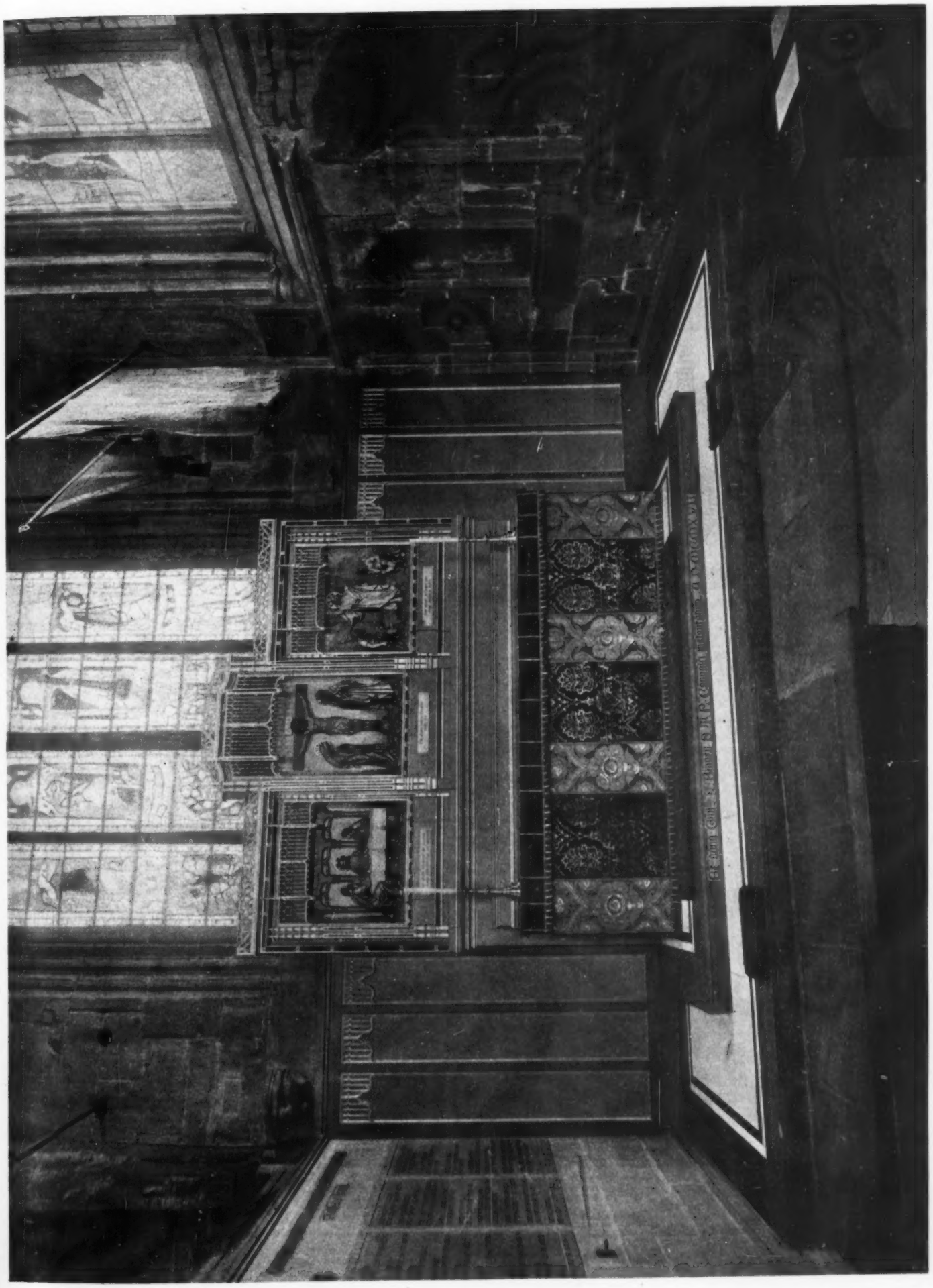
Buildings at Tilbury, for the Port of London Authority. MR. EDWIN COOPER, F.R.I.B.A., Architect.

Police Houses at Tilbury, for the Port of London Authority. MR. EDWIN COOPER, F.R.I.B.A., Architect.

Police Houses at Tilbury, for the Port of London Authority. Mr. Edwin Cooper, F.R.I.B.A., Architect.

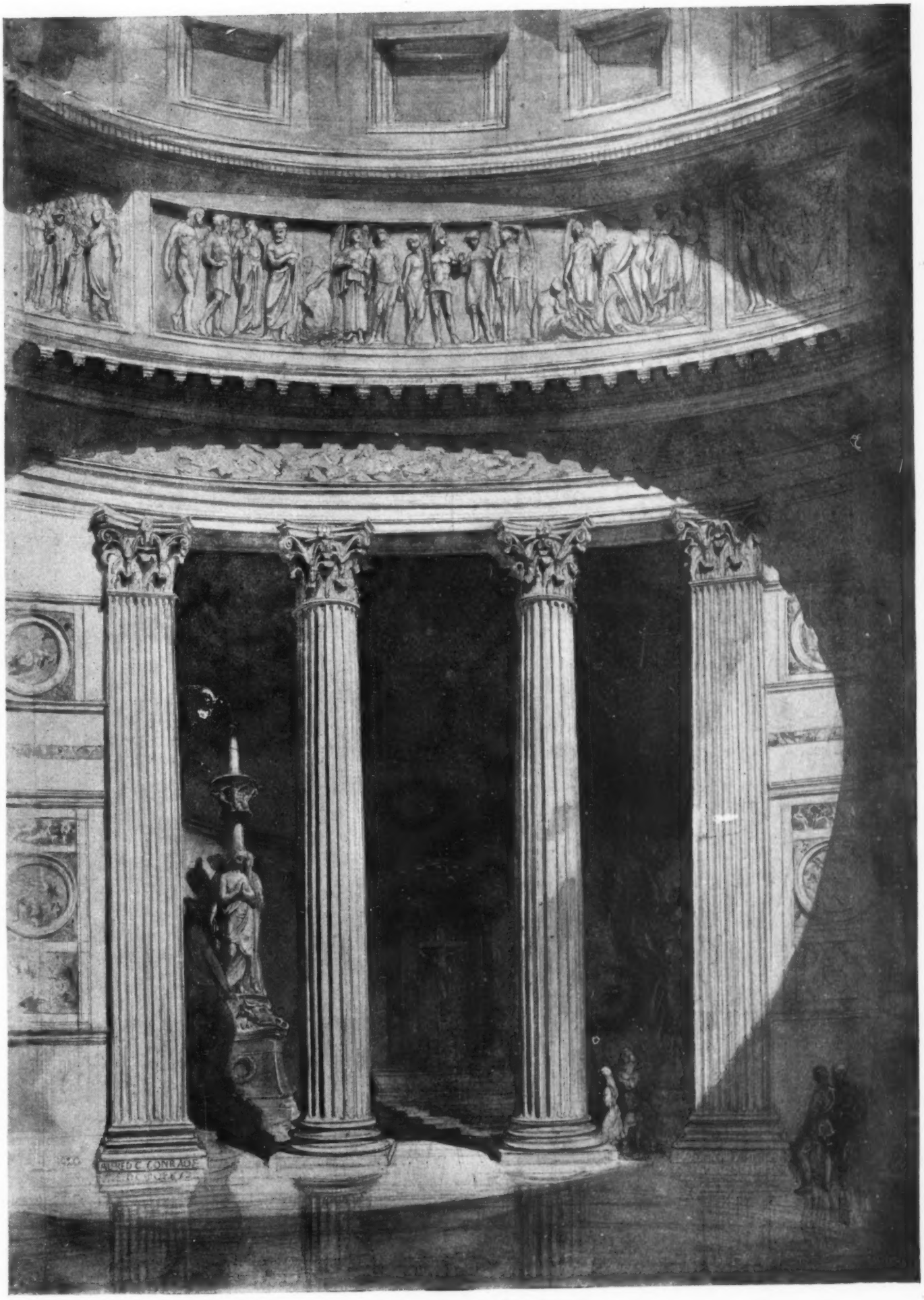


St. George's (Cheshire Regimental War Memorial) Chapel, Chester Cathedral (South Transept). MR. G. GILBERT SCOTT, A.R.A., Architect.



SS. Nicholas and Leonard Chapel, Chester Cathedral (South Transept). MR. G. GILBERT SCOTT, A.R.A., Architect.

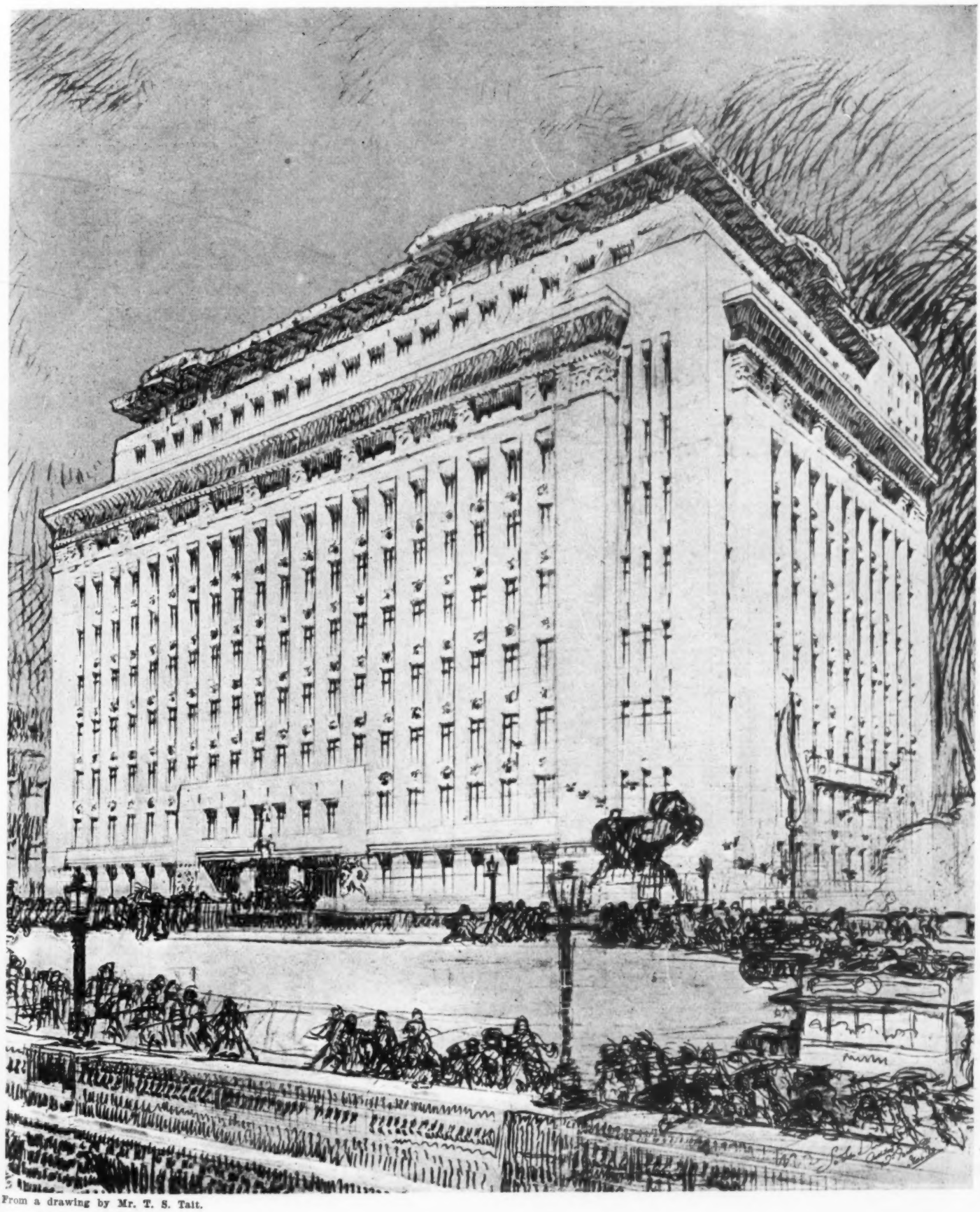
Firemen's Houses at Tilbury, for the Port of London Authority. MR. EDWIN COOPER, F.R.I.B.A., Architect.



Bay of the Pantheon, Rome. From a drawing by MR. A. C. CONRADE.

Bush Terminal Building, New York.

MESSRS. HELMLE & CORBETT, Architects.

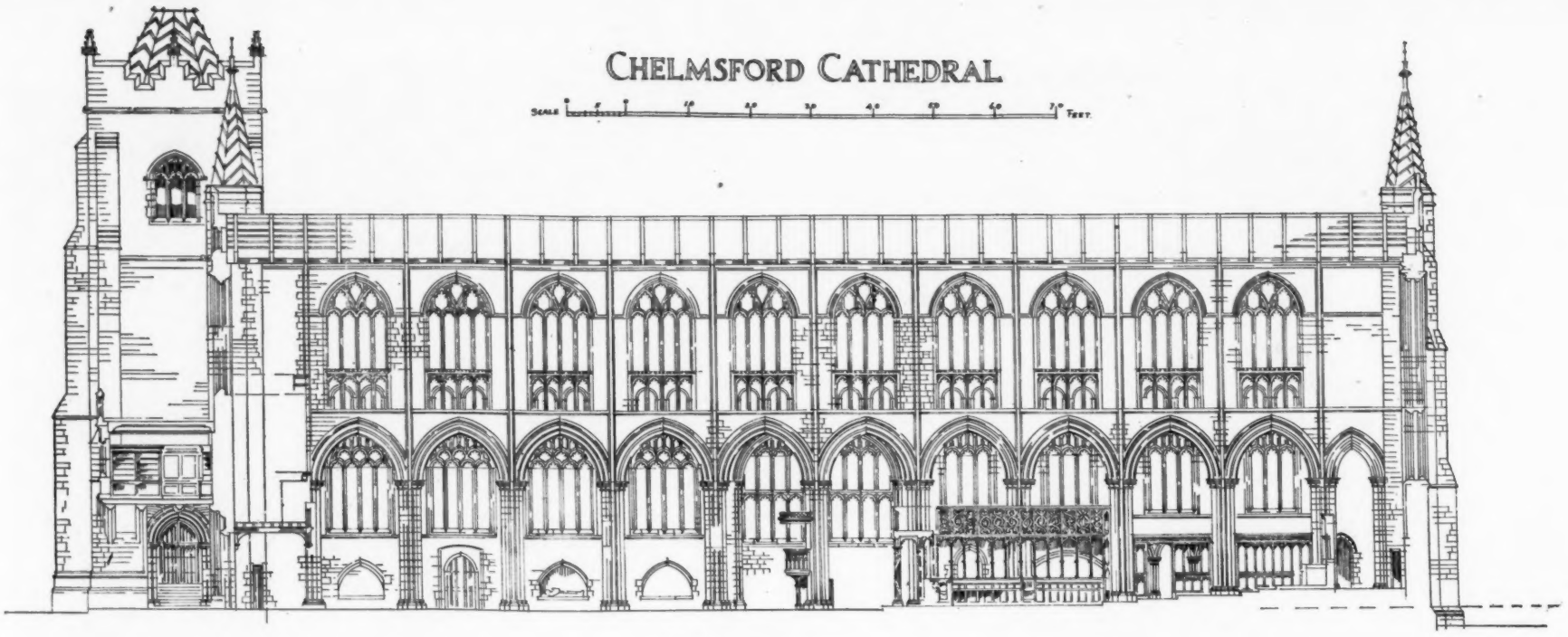


From a drawing by Mr. T. S. Tait.

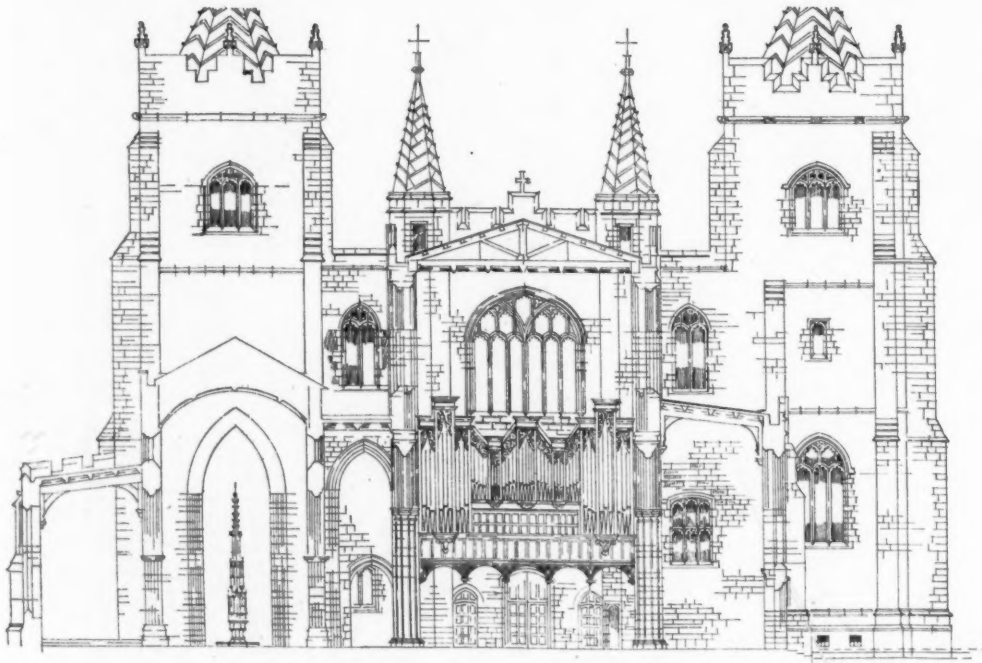
Adelaide House: View from London Bridge.

SIR JOHN J. BURNET, A.R.A., & PARTNERS, Architects.

CHELMSFORD CATHEDRAL

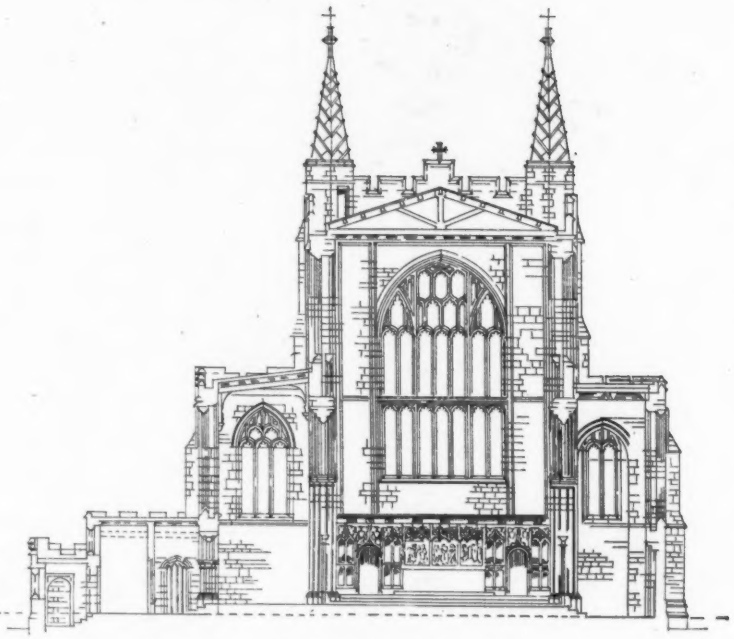


LONG SECTION



[See also inset illustration.]

CROSS SECTION LOOKING WEST



CROSS SECTION LOOKING EAST

SIR CHARLES A. NICHOLSON, Bart., F.R.I.B.A., Architect.

New Premises for Messrs. Bourne & Hollingsworth, Ltd., Berners Street, W.
Messrs. John Slater & Keith, Architects.

LONDINIUM: ARCHITECTURE AND THE CRAFTS.—I.

BY W. R. LETHABY.

In attempting to give some account of Roman building and minor arts in London, I wish to bring out and deepen our sense of the antiquity and dignity of this city, so as to form an historical background against which we may see our modern works in proper porportion and perspective. It is curious that Roman building in Britain has hardly been studied as being part of the story of our national architecture. (The best book is Mr. John Ward's "Romano-British Buildings and Earthworks.") The subject has been neglected by architects and left aside for antiquaries. When this history, to which I should like to make some contribution, is written, it will appear how important and suggestive it is and how very different Roman art was in fact from the "classical style" of ordinary architectural treatises. General considerations will be deferred to the end, and we will begin with practical details. I want, however, to ask readers who may know any facts bearing on the subject, however small they may be, to put them on record by sending a note to *The Builder*. (For many records of discoveries in London, see the synopsis in *The Builder*, January 2, 1920.)

Building Materials and Methods.

Roman building methods were remarkably like our own of a century ago. The large number of tools which have been found and brought together in our museums are one proof of this. We have adzes and axes, hammers, chisels and gouges, saws, drills and files; also foot rules, plumb-bobs and a plane. The plane found at Silchester was an instrument of precision; the plumb-bob of bronze, from Wroxeter, in the British Museum, is quite a beautiful thing, and exactly like one figured by Darenberg and Saglio under the word *Perpendicularum*. At the Guildhall are masons' chisels and trowels; the latter with long leaf-shaped blades. (For the history of tools in antiquity, see Prof. Flinders Petrie's volume.) A foot rule found at Warrington gave a length of 11.54 inches. The normal Roman foot is said to be 11.6496 inches (also .2957 m.). This agrees closely with the Greek foot and the Chaldean. (What is the history of the English foot?)

The length of the Roman foot, a little over 11½ of our inches, is worth remembering, for measurements would have been set out by this standard. For example, we may examine the ordinary building tile used in Londinium. In the Lombard-street excavations of 1785 many Roman bricks were found which are said to have measured about 18 in. by 12 in. I have found this measurement many times repeated, and also three more precise estimates. Dr. Woodward said that bricks from London Wall were $17\frac{4}{10}$ in. by $11\frac{6}{10}$ in., and he observed that this would be 1½ by 1 Roman feet. Mr. Loftus Brock gave the size of one found in London Wall as 17 by 11⅝ in. Dr. P. Norman gave the size of another tile as about 17½ in. by nearly 12 in. At the Guildhall are several flue and roof tiles about 17½ in. long, and a large tile 23½ in. long. We shall see when we come to examine buildings that the dimensions in many cases are likely to have been round numbers of Roman feet.

Masonry.—Walling had three main origins in mud, timber, and stone. Walling stones were at first, and for long, packed together without mortar. Mud and stone were then combined; later mortar took the place of mud, being a sort of mud which will set harder. In concrete, again, the mortar became the principal element. Stone walling was at first formed of irregular lumps. When hewn blocks came to be used a practice arose of linking them with wood or metal cramps. There are three main types of wall construction—aggregation of mud, framing of timber, and association of blocks of stone. A later development of mud walling was to break up the material, by analogy with hewn stone, into regular lumps separately dried before they were used; thus crude bricks, the common building material in antiquity, were formed. Roofing tiles were developed from pottery, and such tiles came to be used for covering the tops of crude brick walls. Then, later, whole walls were formed of baked material, and thus the tile wall was obtained. An alternative method of using mud was to daub it over timber or wattle (basket work) of sticks, and this seems to have been a common procedure in Celtic Britain.

Interesting varieties of concrete walling were developed by Roman builders. One of these was the use of little stones for the faces of a wall, tailing back into the concrete mass and forming a hard skin or mail on the surfaces, very like modern paving. Triangular tiles with their points toothed into the concrete mass were also used. Then tile courses were set in stone and concrete walls at every few feet of height.

I have been speaking of general principles and history, not limiting myself to Britain and Londinium, but the evolution of the wall is an interesting introduction to our proper subject.

In Londinium wrought stonework must have been very sparingly used because of the difficulty and cost of transit. There were columns, pilasters, plinths, cornices, &c., but it may be doubted whether there were any buildings other than small monuments wholly of such masonry. Even in the first century the "details" of masonry were far from being "correctly classical," and ornaments were very redundant and inventive. Provincial Roman building was something very different from the grammar propounded by Vitruvius. As we may study it in the fine museums of Treves, Lyons and London, it seems more like proto-Romanesque than a late form of "classic." The Corinthian capitals of Cirencester are very fine works indeed; the acanthus is treated freshly, the points of the leaves being sharp and arranged as in Byzantine work; a sculptured pediment and ornamental frieze at Bath are also free and fine; on the other hand, moulded work is usually coarse and poor. An interesting architectural fragment found in London was the upper drum of a column which had bands of leafage around the shaft and was a remote descendant of the acanthus column at Delphi. (Fig. 1.) Parts of small columns and their bases have been found, the latter with crude mouldings. I mention them because small circular work was usually turned in a lathe like Saxon baluster-shafts.

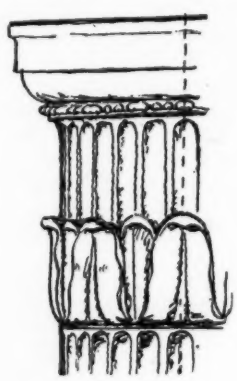


FIG. 1.

A few fragments of mouldings and other stones are in our museums (Fig. 2), and a considerable number of semi-circular stones have been found which must have been copings. Large wrought stones were usually cramped together; lewes-holes show how they were hoisted; smaller wall-facings were, I think, cut with an axe instead of a chisel. We find mention of one stone arch (a small niche?) in a Minute of the Society of Antiquaries:—"Mar. 8, 1732: Mr. Sam Gale acquainted the Society, yt in digging up some old foundations near ye new Fabric erected Anno 1732 for ye Bank of England Mr. Sampson ye architect discovered a large old wall, eight foot under ye surface of ye ground, consisting of chalk stone and rubble, next to Threadneedle st. in which was an arch of stone and a Busto of a man placed in it standing upon ye plinth, which he carefully covered up again: there was no inscription but he believed it to be Roman."

FIG. 2

Mortar and Concrete.—Roman builders early learnt how to make good mortar and concrete, being careful to use clean coarse gravel and finely divided lime. They also found that an addition of crushed tiles and pottery was an improvement, and for their good work used so much of this that the mortar became quite red. "Roman mortar was generally composed of lime, pounded tiles, sand and gravel, more or less coarse, and even small pebbles. At Richborough the mortar used in the interior of the walls is composed of lime and sand and pebbles or sea-beach, but the facing stones throughout are cemented with a much finer mortar in which powdered tile is introduced" (T. Wright).

One of the advantages of coarsely-crushed tiles is that it absorbs and holds water so that the mortar made with it dries very slowly and thus hardens perfectly. In *Archæologia* (LX) an analysis is given of "mortar made with crushed tiles as grit in place of, or in conjunction with, sand." In Rochester Museum a dishful of the crushed tile is shown which was taken from a heap found ready for use at the Roman Villa at Darenth. I may say here that I have found mortar prepared in this way wonderfully tenacious and suitable for special purposes like stopping holes in ancient walls. A strong cement made of finely powdered tiles, lime and oil was used by Byzantine and mediæval builders and probably by the Romans also. Villars d'Honnecourt (XIII c.) gives a recipe: "Take lime and pounded pagan tile in equal quantities until its colour predominates; moisten this with oil and with it you can make a tank hold water." The use of crushed pottery in cement goes back to Minoan days in Crete.

In London a long, thick wall of concrete formed between timbering was recently found between Knightrider and Friday streets; it showed prints of half-round upright posts and horizontal planking; it bent in its course and may have been the boundary of a stream. On the site of the old Post Office a Roman rubbish pit was found, about 50 by 35 ft. in size. "In late Roman times the whole pit had been covered with concrete about a foot thick and a building had been erected on the spot." (*Archæol.* 66.) At Newgate the Roman structure was erected on a "raft" of rubble in clay finished with a layer of concrete. Rubble in clay formed the foundation of the City wall.

Many walls, described as of chalk, rubble or rag-masonry, have been found in London—one instance at the Bank has been quoted above. Chalk and flints were the most accessible material after local gravel, clay and wood. Mr. F. W. Troup tells me that "in the foundations for the Blackfriars House, New Bridge-street, we exposed a remarkable foundation (possibly not Roman). It consisted of rammed chalk, fine white material about 4 ft. wide and high, laid on great planks of elm six inches thick, which appeared to be sawn. These were laid side by side in the direction of the length of the wall, which ran along the west bank of the Fleet River." I mention this, although it was probably a mediæval wall, as an example of a record; we ought to have every excavation registered. The walls of a room found in Leadenhall-street in 1830 were of rubble forming a hard concretion, with a single row of bond tiles through the thickness of the wall at about every two feet

in height. A sketch of this wall at the Society of Antiquaries shows it plastered outside and in. This was one of the common types of walling. Better stone walls were formed with face casings of roughly-squared little stones—what the French call *petit appareil*—as described above. An immense amount of piling was used in wet ground under streets and wharves, as well as walls. Foundations have been discovered of three rows of piles close together with a wall coming directly on their heads. (Fig. 3.)

FIG. 3.

Tile Walling.—The brick commonly used in Rome was a crude or unbaked block, the burnt walling-tile was, as said above, developed from pottery and it always remained pottery-like in texture and thin in substance. As Mr. T. May has said: "They were made of heavy clay, well tempered and long exposed; the modern practice is to use the lightest possible clay right off without tempering" for bricks. Walling tiles were used in Londinium not only as bonding courses but for the entire substance of walls. It is usual to write "Roman tiles or bricks" interchangeably, but in origin and character the thing was a tile, and, indeed, roofing tiles with flanged edges were used as a walling material occasionally. Tiles were of various sizes and shapes, but an oblong, 1½ ft. by 1 ft. and about 1½ in. thick, was most usual. In the Guildhall Museum are several triangular tiles which must, I think, have been used for facing walls with concrete cores. Solid tile-walling was used in Londinium so extensively that it was evidently a common material for better buildings. The Lombard-street excavations of 1786 exposed "a wall, which consisted of the smaller-sized Roman bricks, in which were two perpendicular flues; one semicircular and the other rectangular; the height of the wall was 10 ft. and the depth to the top from the surface was also 10 ft." Here we have evidence of a brick wall rising the full height of one story at least. (*Archæol.* VIII.) Roach Smith noticed a wall in Scott's Yard "eight feet thick, entirely composed of oblong tiles in mortar." Mr. Lambert has recently described some walls of brick 3½ ft. thick found at Miles-lane. A building in Lower Thames-street had walls of *red* and *yellow* tiles in alternate layers. This fact I learn from a sketch by Fairholt at the Victoria and Albert Museum, and such use of bricks of two colours was a common practice. In Hodge's sketches of the tile walls of a great building discovered at Leadenhall Market it is noted that some of the courses were red and buff. Price recorded of walls, 2½ ft. thick, found in the Bucklersbury excavations, that "the tiles were the usual kind of red and yellow brick."

More recently a bath chamber has been found in Cannon-street built of tiles which on the illustration are indicated in alternate courses of red and yellow. In the description in *Archæologia*, it is remarked: "It would appear that the yellow was preferred, the red being employed where they were not visible." Years ago Charles Knight observed that the tiles used in the City wall at America-square varied from "bright red to palish yellow." This has been confirmed by more recent accounts in *Archæologia*. Finally Roach Smith, describing the discovery of a part of the South or River Wall of the City [*Archæological Journal*, vol. I], says that the tiles used as bonding bands were straight and curved-edged [that is, flanged roof tiles], red and yellow in colour. At the Guildhall there is a roof tile and a flue tile of yellow colour. Building with tiles may for long have been customary, but the use of red and yellow tiles in the way described would probably have been a fashion during a limited time only, and in that case it follows that the buildings erected with red and yellow tiles are likely to be nearly contemporary; the date would, I suppose, be the fourth century. Specially-made tiles were used for columns. At the Guildhall are several round tiles 8 in. diameter, suitable for the piers of a hypocaust. Also some semicircular tiles 12 in. in diameter. In Rochester Museum are some quadrants making up a circle about 1½ ft. in diameter.

Arches and Vaults.—The arches in the City wall, where it passed across the Walbrook, described by Roach Smith, were of no great span (3½ ft.). They were constructed of ordinary tiles and were of a roughly-pointed shape. Arches of this form were not infrequently used in Roman works; they were not the result of inaccurate building. About a dozen years ago a well-built pointed arch of alternate tile and tufa, found at Naples, was described in "Archæologia." The tiles, although thin, were sometimes made slightly wedge-shaped, and the city gates at Silchester seem to have had arches of such bricks.

The only London vault which I can find mentioned is one found exactly two hundred years since at St. Martin-in-the-Fields. A minute of the Society of Antiquaries reads: "May 2, 1722: Mr. Stukely related that the Roman building in St. Martin's Church was an arch built of Roman brick and at the bottom laid with a most strong cement of an unusual composition, of which he has got a lump. There was a square duct in each wall its whole length, of 9 in. breadth; there were several of these side by side: this building is below the springs on the gravel." This building that was an arch, with its many flues, and cement floor—doubtless *opus signinum*—was obviously a Roman bath chamber, but probably it was quite small.

Evidence of the existence of fairly large vaults has been found at the Baths of Silchester, Wroxeter and Bath. These were all constructed in a most interesting and suggestive way of voussoirs made as hollow boxes in the tile material. Similar box voussoirs have been discovered at Chedworth and elsewhere.

I have found two such box voussoirs in the Rochester Museum, each about 9 in. by 6 in. on the face and 5 in. on the soffit (Fig. 4). The

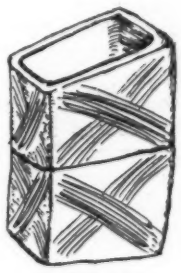


FIG. 4.

surfaces are roughly scored across with parallel lines forming an ×. These two tiles together show an obvious curvature; they came from a villa at Darenth. In the Guildhall Museum I have also found a box-voussoir which is almost identical with those at Rochester. It is thus described: "74, Flue (?) tile, red brick, the front decorated with incised cross lines; in the centre both front and back is a circular perforation; 9½ in. long, 6¾ in. high, 6½ in. wide." The longest dimension is not in the direction of the tube and the height is greater at one end than the other, so that the wedge form is quite apparent. The small holes in both the larger

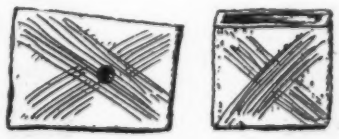


FIG. 5.

sides were either to give better hold to the mortar in which they were set, or to allow of their having been strung together laterally (Fig. 5).

The Bath examples have square holes. Roach Smith recorded what must have been broken parts of similar voussoirs as found in Thames-street in 1848 (*Jour. Brit. Archæol. Assoc.*, Vol. IV), but here they seem to have been used as waste material in building the little piers of hypocausts. Roman builders also constructed vaults of pipes and pots set in mortar concrete as were our box-voussoirs, but I know of no British examples. Vaults of wide span seem to have covered large chambers in the Basilica at Verulam (see V.C.H.). The method of using the box-voussoirs has been well explained from the

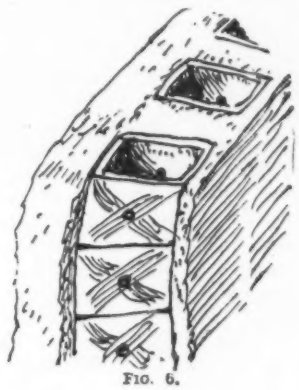


FIG. 6.

Silchester examples by the late Mr. Fox in *Archæologia* (*cf.* Fig. 6).

A fragment at Westminster Abbey seems to be part of a voussoir. (Fig. 7.) Well constructed arched sewers have been found in the City (see "Victoria County History").

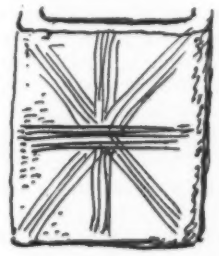


FIG. 7.

Many socketed water-pipes are in our museums. Such pipes were occasionally used in Rome as downpipes, and we might do worse than revert to the custom and get rid of the iron rust nuisance. In the British Museum there are some larger socketed pipes with small holes cut in them along a line. These must I think, have been for draining surface water, for which purpose flue tiles were also used. Larger sewers were of brick or stone.

Carpentry.—In mediæval days the carpenter was the chief house builder, and much wood would have been used in Roman London. In 1901–2 remains of piling was found in the bed of the Walbrook at London Wall. These piles had served as supports for dwellings. "The large quantities of loose nails indicated that the superimposed dwellings were of timber" (*Builder*, December 13, 1902). The better class dwelling in Bucklersbury, to which belonged the fine mosaic floor now at the Guildhall, seems to have been largely of timber. Only on December 8 last Mr. Lambert described at the Society of Antiquaries a remarkable piece of wharfing on the river bank at Miles-lane. This was a solid wall of squared baulks of timber about 2 ft. square, laid one over the other and having ties into the ground behind. The construction showed an interesting set of tenons, halvings and housings. A bored wood pipe was also found. In Thames-street a house found in 1848 had a well-made drain made with 2 in. planks forming bottom and sides, which is said to have been covered in with tiles.

(This introduction will be concluded in our next issue.)

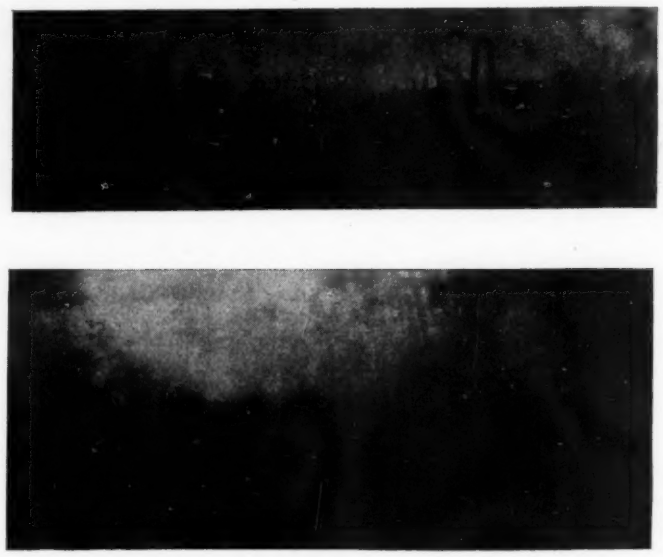
THE COAL SMOKE NUISANCE.

BY ERNEST NEWTON, R.A.

IN the days of King Edward the First, when London had no more than 50,000 inhabitants, coal smoke had already begun to be a nuisance, although the number of coal fires could only have been very few. The smoke abaters of those days were not so patient as we are. We read that a petition was presented to the king, who enacted that the burning of sea coal, as it was then called, should be a capital offence. We do not know how many people suffered the extreme penalty, but certainly not enough to eradicate the habit, as we continue to-day to burn the same sort of coal in the same way as they did 600 years ago. We are not now liable to any such severe penalty, and anyone is at liberty to fill the air with coal smoke without the fear of suffering a violent death at the hands of the public executioner. There are, however, signs that people are becoming alive to the serious menace of this pollution of the atmosphere. The brilliant sunshine and clear, pure air of last summer have done more than all the foggy winters we have endured to convince us of the importance of getting rid of it.

Authorities are not unanimous in their forecast of the time when our coal will be exhausted, but they all agree in condemning the present wasteful methods of using it. Dr. Saleeby anathematises the kitchen range, burning soft coal and producing the "hellish and dismal cloud which makes our cities so infernal in winter," and relegates it to "museums which exhibit other horrors of the dark ages." The gas cooker he calls "civilisation," and the kitchen range "savagery." Many people seem to think that if they have gas fires, or other means of heating all the rooms but their sitting-room, they have done enough, and might allow themselves the indulgence of this one coal fire. But, of course, this is just the fire that does the mischief, as it is used almost continuously, whereas the others are only used occasionally. It is unfortunate that the report of Lord Newton's Committee, while showing that the Committee appears satisfied that adequate means other than coal exist for cooking and warming, and while emphasising the fact that the housing situation affords a unique opportunity for constructive reform, limits a recommendation to the extent of allowing one, or in exceptional circumstances two, coal grates to be installed. In small houses of this kind it is very rare that more than one fire is continuously in use, so that the recommendation leaves matters much as they were.

Dr. Leonard Hill calculates that in some part of England or Scotland which does not receive some of this city-made pollution. He has also compiled a table showing the impurity in the air deposited at different places, in tons per square mile. For part of London this deposit is nearly 40 tons per month. He also calculates that between 6 and 9 o'clock of a winter morning, when domestic fires are in full operation, the quantity of soot emitted is over 200 tons. In our manufacturing cities, where, of course, the factory chimney is the main source of pollution, the illustrations show the difference between a Sunday, when the fires are banked, and other days of the week. From the moment the



THE POTTERIES.

of our manufacturing cities as much as 40 to 50 per cent. of the sunlight is cut off by smoke. He estimates that domestic chimneys alone deposit no less than two million tons of soot per annum. London's share of this soot-fall is put at 76,000 tons, and the damage caused by it as equivalent to £4,000,000 a year. Dr. Owens states that it is an established fact that smoke-laden air from cities is carried by the wind to such great distances that there is no chimneys begin their work there is a progressive thickening and pollution of the air.

Have we the right to compel people to live and work in such an atmosphere? It is not as if nothing could be done. Pittsburg, which used to be known as "Hell with the lid off," was faced by the same problem, and the Americans have tackled it with characteristic thoroughness. Scientific stoking has not only cleared the air but has put money into the pockets of

ON A FOGGY DAY.

ON A CLEAR DAY.

Westminster Abbey.

AT 11 A.M. ON SUNDAY.

AT NOON ON MONDAY.

A Manufacturing Town.

the manufacturers. It is, of course, the job of the engineer to deal with factory chimneys, but the domestic grate is very much the architect's business. As a matter of fact, however, we are too much inclined to accept the position as inevitable, and we go on planning for smoke-producing fires as if no other method of warming our houses and cooking our food existed. The late Lord Moulton has said, "If we are ever to attain to the two great ideals of smoke abatement and fuel economy the dirty and wasteful coal fire must go. Do not forget that the gas fire is twice as efficient as the coal fire, and of its very nature and construction tends to greater convenience, cleanliness, and the saving of labour." There has been some prejudice against the use of gas fires, a prejudice founded on the old-fashioned method of filling an ordinary fireplace with asbestos lumps amongst which played a sickly blue flame; a type of fire which gave the minimum of heat with the maximum of gas consumption. The modern gas fire, which is of an austere simplicity, is as far removed from its prototype as a modern express locomotive is from "Puffing Billy." It is silent, bright, and clean, gives radiant heat which can be increased or diminished at will, and provides ample movement of the air for efficiently ventilating the room.

The coal-less house has everything to recommend it; there is no cleaning out of kitchen flues and wrestling with clinkers, no raking out of sitting-room grates, no carrying of heavy coal scuttles or housemaids' boxes full of ash and cinders, and by installing a combination of gas cooker and coke boiler the cook is no longer obliged to waste tons of coal and to give three-quarters of her attention to the boiler and only a quarter to cooking. It is undeniable that the kitchen boiler is the cause of endless friction and bad temper when it is the dominating part of the cooking apparatus. The winter is robbed of half its terrors when we have no longer to come down to a cold room with a sulky coal fire which gives no heat until breakfast is finished and the room empty. In the evening, too, the fullest warmth can be enjoyed up till the last moment—no one with a conscience can make up a big coal fire late at night—and there will be a cheerful fire to go to bed and to get up by. An eminent doctor has been quoted as saying that the use of gas fires in bedrooms has been so beneficial to his patients that it has cost him a fortune in diminished fees.

Let us hope that the days of the old raw coal fire are numbered, and that it will soon be considered "bad form" and hopelessly antediluvian to have chimneys pouring out soot-laden smoke to poison the community, stunt the growth of children, and destroy our tempers, our furniture, and our buildings. During the coal dispute the air was sweet and clean. Vegetables and flowers flourished in London gardens. Now that we can get coal once more the old state of things is gradually returning. The mad dance of "blacks" on door steps and window sills has begun again, and a sooty film is depositing itself over everything.

There is no longer any excuse for indifference. We have gas, electricity, coke, and oil at our disposal, and wood for those who can afford it. Smokeless fuels are also to be had. The one thing we must abolish is bituminous coal. We all know how New York has dealt with the matter and now enjoys a clear, smokeless atmosphere, and we may by the goodwill and common sense of its inhabitants bring about the same transformation in the air of London.

MEETINGS.

MONDAY, *January* 9.

Royal Institute of British Architects.—Business Meeting: Election of Members. At 9, Conduit-street, W.1. 8 p.m.

Surveyors' Institution.—Mr. W. R. Davidge on "Problems of Greater London." At 12, Great George-street, S.W.1. 8 p.m.

TUESDAY, *January* 10.

Liverpool Architectural Society.—Mr. W. G. Newton on "Verona." At 13, Harrington-street. 6 p.m.

Institute of British Decorators.—Mr. S. Hicks on "Art in Modern Education." At Painters' Hall, E.C.4. 7.30 p.m.

WEDNESDAY, *January* 11.

L.C.C. Central School of Arts and Crafts.—Sir Banister Fletcher on "English Mediæval Architecture: The Pre-Mediæval Periods."

THURSDAY, *January* 12.

Society of Architects.—Sir Charles Ruthen on "The Architect and the State." 8 p.m.

College of Estate Management.—Professor S. D. Adshead on "Town Planning." 5.30 p.m.

Architects' and Surveyors' Assistants' Professional Union.—Metropolitan Branch Meeting. At Caxton Hall, Westminster. 7 p.m.

Pittsburg As It Is.

[The photograph of Pittsburg "As it was" is so blurred with smoke that nothing else would be seen in a reproduction.]

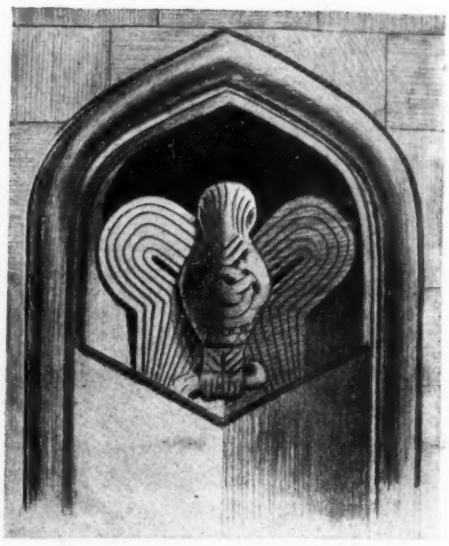
THE EXTERNAL NICHE IN ARMENIAN ARCHITECTURE.

BY CYRIL G. E. BUNT.

IT is scarcely to be expected that students will ever have a better opportunity of studying Armenian architecture than that provided by the Fetvadjian drawings at the Victoria and Albert Museum. It therefore seems opportune, while they are still on exhibition, to look closely into certain characteristic features of technical interest by way of adding text to those admirable illustrations.

The most casual observer must have been struck by one peculiar structural (or rather ornamental) feature that constantly occurs in Armenian churches. The reference is to the presence of tall, narrow, exterior niches that break the wall-masses with daring precision. So insistent a feature one would anticipate to be more than a mere decorative feature; yet the writer is convinced that it was not so originally. True, one finds them usually in a position in which, incidentally, they somewhat reduce the thickness of solid wall-mass resulting from the normal practice in Armenia of burying the apses in the depth of masonry—a practice which may have been adopted from Coptic sources. Diagram 1 (*see* p. 40) a rough plan of the apsidal end of St. Minas, Horomos, which may serve as a typical example, will show, however, that the depth of the niche is not always sufficient to warrant a general application of this theory. At the same time the idea is structurally sound, for they usually emphasise, externally, the position of the hidden apses. They occur frequently on three sides (as at Ani Cathedral), and on all four façades (as at Vagharshapat), and where they occur on other than the east wall it will be found that lateral apses or chapels are usually indicated. In the case of churches of polygonal plan niches are placed symmetrically on opposing facets, so that sometimes we get (as at the Shepherds' Church, Ani) a deep niche on alternate faces, giving (on plan) a star-shaped structure. Usually they are found only in the walls of the lower story, but examples of drums so decorated are not unknown—a fact which argues strongly for their being solely decorative in purpose. In elevation they bear some resemblance to stilted, hooded squinches, though only one church that I know has examples which cut the angles squinch fashion. This exception is found on the drum of the seventh-century church at Mastara, where each angle is cut off by a niche-like recess that has no hood but cuts up into the circumference of the cupola roof. Deep or shallow, the niches, with this one exception, all terminate in a canopy, usually semi-circular. Some have a plain hood, but the majority are treated decoratively and many with great originality.

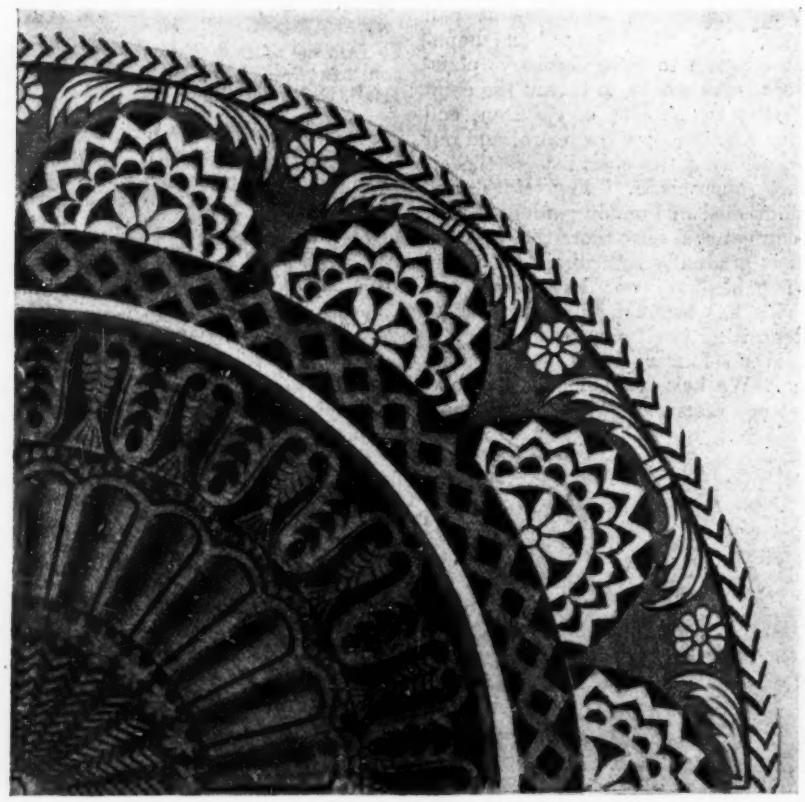
It is quite impossible to describe here the many beautiful specimens—veritable gems of the sculptor's art—that are found. A selection I have been enabled to make, by the kindness of Mr. Fetvadjian, from drawings not shown in his exhibition, will serve to show how varied and exquisite is the work on some of these hoods. Look, for instance, at example "A," from the eighth (or early ninth) century church of the Mother of God, Oghouzli. The artist's rendering of this excellent design needs no eulogy; it expresses the beauty of the original carving with skilful care. Example "B," from the tenth-century church at Tatev, is of quite another style. The drawing exhibits the scalloped hood which is a prevalent type, and gives some idea of the strong precision with which these niches cut into the wall-mass. The narrow archivolt is daringly simple in conception. Example "C" is from the interesting church of St. Gregory Abouhamrentz, Ani, of the tenth century. The niche here is severely plain, harmonising with the simply-moulded archivolt and almost Classic cornice. It is relieved by the presence of a twisted pilaster obscuring the angle of the recess. This polygonal church has six niches, four deep and broad and two shallow, but only this one has the twisted pilaster. The beautiful hood and label shown in example "D" is one of the many interesting fragments which have happily been saved from destruction at Ani, and placed in safety in the museum. It is as good an example of decorative fluted niche of the eleventh century as one could select—restrained in conception and bold in execution, as was all the best work of that period.



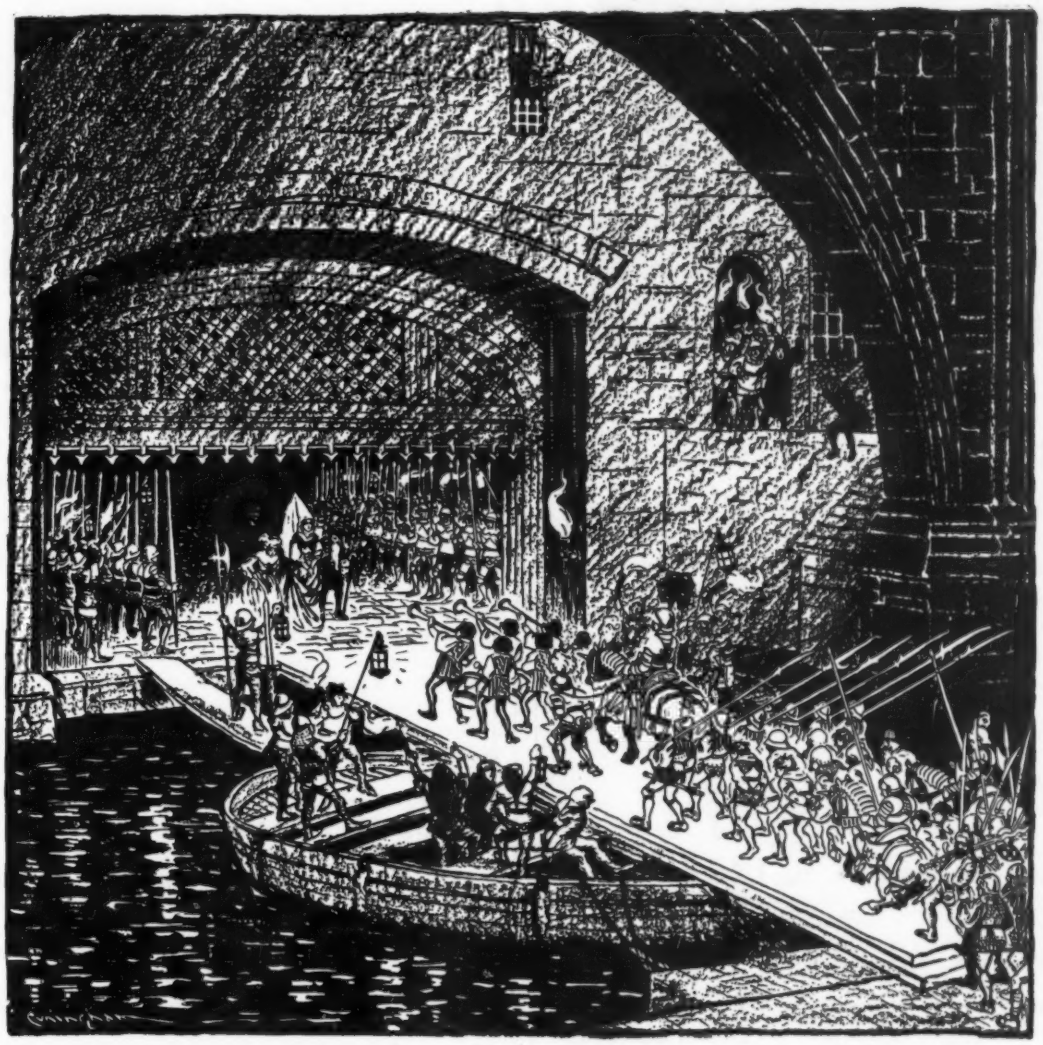
Example "E": Niche hood at Dzar. (Tenth Century.)
From a drawing by MR. A. FETVADJIAN.

The next, example "E," from Dzar (tenth century), is a rare type, unique perhaps in the shape of its canopy, though ogival and trefoil-headed niches are found. The drawing has been selected not only for this feature but also for the wonderful bird sculptured in high relief with which the hood is decorated. Derived from Byzantine art, this bird, in varying degrees of naturalistic treatment, occurs elsewhere, but the quaint handling of its outstretched wings and the interlaced strap-work (that might be Celtic) on its breast are details which make this specimen most interesting for stylistic comparison. Example "F," of the thirteenth century, is from the ornate little church of St. Gregory the Illuminator, Ani, whose Moslem name, "*Nakhshlou*," appropriately describes it as "The Much Decorated." The drawing, unfinished though it is in the details of its label and the carved arch of the elegant false arcading (an interlacing cord motive), yet gives the salient points of interest. These are the fine ornamentation of the hood of the niche and one of the decorated spandrils carved in rich relief, a frieze of which surrounds the church. In the case of this church, as, indeed, with many, it must be understood that whether there are two, six, or more niches on one building they are generally varied in ornamental motive. Sometimes one finds interlaced ornament, as in the present example, sometimes bird or animal forms, or the frequent scalloped or fluted forms. One of about this period has a strange and original treatment of two snake-like monsters, with twisted tails and gaping jaws of formidable teeth, opposing each other in schematic wrath. It would seem that these niche heads were considered happy opportunities for the exercise of the architect's most elaborate fancies.

One or two examples exhibit an unexpected feature, one that may be of peculiar significance in determining the genesis of Gothic forms. I refer to the presence of pierced, foliated cuspings pendant from the edge of the label. An early example, twelfth century, and one of the best, which, however, is in Georgia at Ikorta, is illustrated by Strzygowski, but fine examples are to be seen at Gandzasar (thirteenth century) and at Haridsha. The oldest portion of the church of St. Gregory, Haridsha, dates from the seventh century, but it is obvious that although the niches are in this part they cannot date from this time. There is little doubt that they must date from 1185, when the church was improved and enlarged. They are relatively narrow and of small depth, a characteristic of late date; nor do they indicate the



Example "A": Niche hood at Oghouzli. (Eighth Century.)
From a drawing by MR. A. FETVADJIAN.



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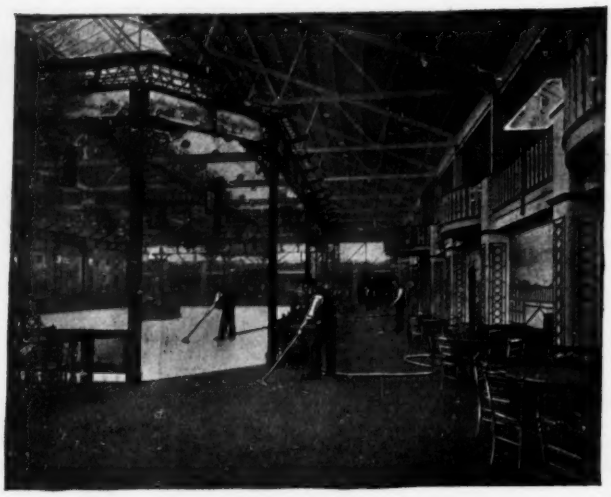

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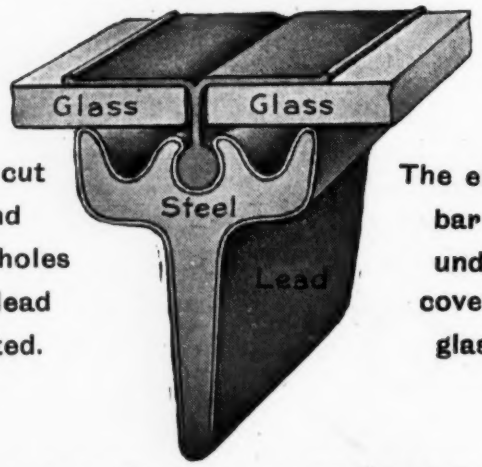

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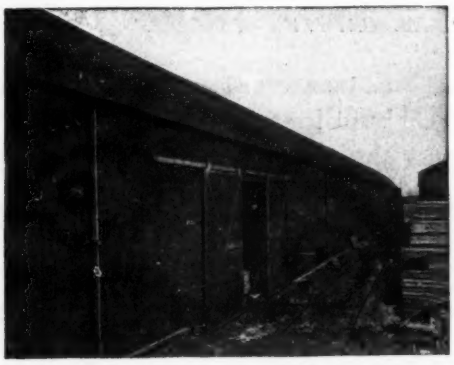

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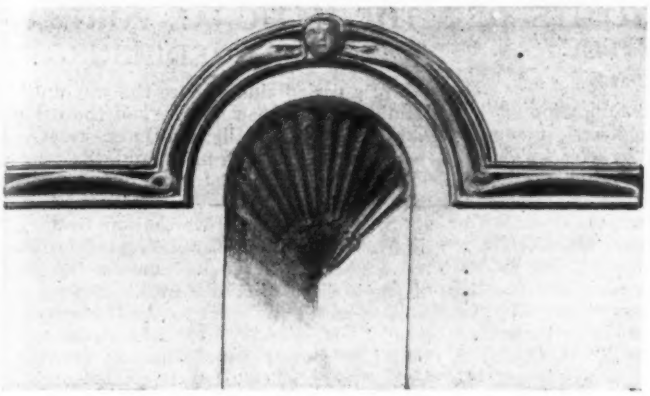
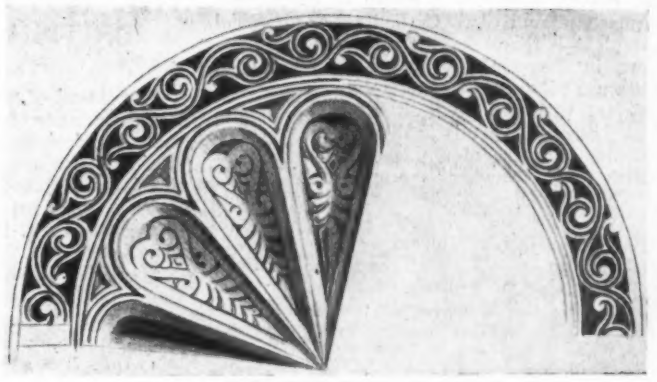


Example "B": Niche hood and Archivolt at Tatev. (Tenth Century.)



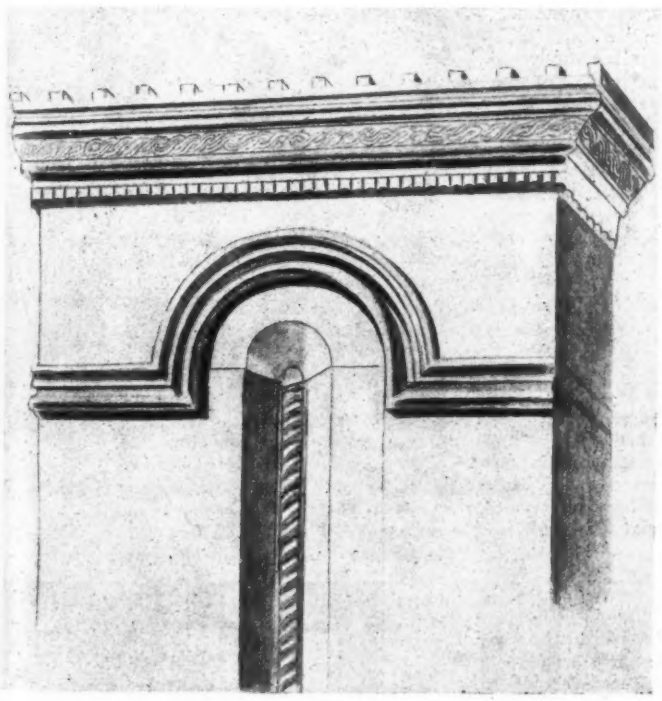
Example "D": Niche hood at Ani. (Eleventh Century.)

From drawings by MR. A. FETVADJIAN.

presence of apses. In short, they are an addition. One would anticipate that cutting deeply into the walls as most of these niches do they would be utilised as convenient outlets for windows from the apses, but very few indeed have been made use of thus. Thalish Cathedral (Armenia) and Ikorta (Georgia) are instances where this has been done. Their variation in shape, on plan, is of peculiar interest, for a close analysis gives an insight into their origin as well as their development. This may best be exemplified by rough diagrams (see *p.* 40). No. 1 has been referred to. The simple V-shape is the most prevalent and persistent type, being found on churches from the seventh to the thirteenth centuries. In the early buildings they are generally broad and deep, as at Thalish Cathedral, 668 A.D. (diagram 2); while in the case of St. Gregory the Illuminator, Ani (thirteenth century) they are mere nicks in the wall by comparison—atrophied survivals (diagram 3). St. Ripsime, Elgmiatsin, is earlier by half a century than Thalish, being rebuilt in 618 A.D. Here we find niches of truncated V-shape (diagram 4), than which, I believe, no earlier example of angular niche is to be found in Armenia. The earlier examples are of semi-circular plan. The curious external apses of Ereruk and Tekor do not come within our present survey. But there are vestiges of semi-circular niches to be seen on the ruined church of the Princes Kamsarakhan, Ani, Armenia's oldest surviving church (fifth or sixth century) (diagram 5). It will be seen that on the south-east corner there is the segment of one large niche, while the ruined apse of the small north chapel has, or had, two lesser examples. The fact that these are round and not angular is significant, for in considering origins the earliest form must bear due weight.

No one studying the details of the wonderful ruined citadel at Amman can doubt that much of Armenian ornamental detail was Oriental; and Strzygowski, true to his general theory of the Oriental origin of Christian art, points to the Sassanid Palace, Firuzabad, as supporting the Eastern origin of the niche. But the niches there are rather flat walls recessed between broad buttresses of masonry. Where, then, shall we look for their origin? Rivoira, in his "Moslem Architecture," speaks of the hooded squinches of the Villa Adriana, Tivoli (*circa.* 125–135 A.D.), as anticipating the idea. He may be right, but he made his deduction from the angular type at Akhtamar, which, he says, is "the oldest example beyond reach of controversy of the tall, narrow, V-shaped niches." We have seen that there are earlier examples, and had he known of the rounded niches of the Church of the Princes he could have bridged the gap between Akhtamar and Adrian's villa. If we turn to Byzantine Constantinople, we find exactly similar semi-circular niches on several early churches. To compare the niches of the Church of the Princes, Ani, with those in the side chapel of St. Mary, Pammakaristos, Constantinople (VII–VIII c.) or with those on the central apse of St. Saviour in the Chora (VI c.) is to be convinced of their relationship (diagram 6). In Byzantine architecture, however, the niche never developed angularity as it did in Armenia, as witness the apsidal niches of St. Theodosia, Constantinople (IX c.), St. Saviour Pantocrator, Constantinople (XI c.), St. Panteleimon, Salonica, and St. Theodore, Constantinople (XII c.), and The Apostles, Salonica (XII c.). Even beyond the Bosphorus this was so. The round church of St. Elias, Broussa (*circa.* IX c.) and "Basilica No. 3," Anazarbus (XII c.) are examples. This persistence seems to argue a traditional form employed by Greek Orthodox architects, and it is quite probable that the angular niche was developed in Armenia after the separation from the Orthodox communion in 491 A.D. It would thence follow that the Church of the Princes, Ani, must have been erected before that event, *i.e.*, in the fifth century, although it is said to be of the sixth.

There is no doubt that Byzantine builders had the idea from Roman sources, for the niche as an ornamental motive was familiar to the latter. We find no less than five semi-circular niches employed decoratively on the Porta Aurea Spoleto (third century A.D.), a product of the Diocletian neo-Classic melting-pot from whence many new forms arose. Some resemblance certainly there is between the squinches at Tivoli, the broad, deep niches of the church at Irind, Armenia (seventh century), and the fine thirteenth-century squinch of the Clock Tower at Haghbat. But by the latter date the Armenian architects had run the whole gamut of originality in niche design, although it is not until near the close of the tenth century that we find any great variation from the simple V-shape. At



Example "C": Niche at St. Gregory, Abouhamrentz. (Tenth Century.)

Example "F": Niche hood and Spandril at St. Gregory the Illuminator, Ani. (Thirteenth Century.)

From drawings by MR. A. FETVADJIAN.

that period, however, a group of churches—Marmashan and Ani Cathedral are typical examples—is found having niches of the form shown in diagram 7. The convent Church, Akhtamar (diagram 8), is an isolated example—a variant with two small angles in the interior of the recess. This is really only a pointed moulding in place of a pilaster, such as that illustrated in drawing, example "C."

"The existence of certain common points in Byzantine and Armenian architecture," writes Dalton in his "Byzantine Art," "may be explained on the theory of Byzantine influence on Armenia or an Armenian influence on Constantinople; nor is it easy on present evidence to arrive at a definite conclusion as to which

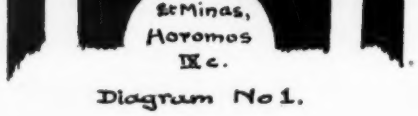


Diagram No 1.

Diagram No 2.

Diagram No 3.

Diagram No 4.

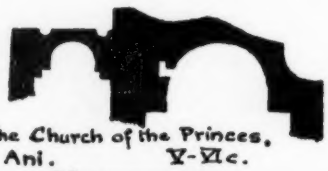


Diagram No 5.

view best suits the facts." The use of the niche, surely one of these common points, supports the former view, although one can scarcely hang the whole complicated question of interacting influences on one architectural feature. Still, one may hope that the foregoing survey may throw a ray of light on this difficult problem. It suggests at least that until the latter end of the fifth century Byzantine influence was predominant, but that after Armenia left the Orthodox Communion, in 491 A.D., it gradually found its own national expression. The development of Saracenic forms by Byzantine Greeks under early Muhammedanism may have given impetus to the idea of the angular niche (found first in the seventh century), and it is natural that Armenian builders, with a genius for architectural expression such as we find exhibited from the ninth to the thirteenth centuries, should have made it so individual a thing that it may be considered peculiarly their own.

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THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The Examinations.

THE Board of Architectural Education of the Royal Institute of British Architects announces that the designs submitted by the following students who are qualifying for the Final and Special War Examinations have been approved: Subject LIX: (*a*) Design for a City Square with Colonnade: Mr. R. J. B. Clark, Mr. W. King, Mr. A. S. Reid, Mr. A. G. Jenson, Mr. F. W. Knewstubb, Miss W. Ryle, and Mr. H. D. Sugden. Designs for various other subjects submitted by the following students have also been approved: Mr. B. Burge, Mr. A. R. Dent, Mr. A. S. Reid, Mr. J. N. P. Conlan, Mr. C. H. Hutton, and Mr. L. F. Shroff.

The following candidates passed the recent Special War Examination of the Royal Institute of British Architects:—

J. S. Allen.
F. W. H. Allison.
E. H. Allsford.
C. D. Andrews.
H. T. B. Barnard.
P. J. Bartlett.
A. Beasley.
E. E. Beaumont.
H. B. Beek.
E. H. Bloomfield.
H. L. Bloomfield.
J. V. Bowring.
P. K. Brauson.
L. C. Brooks.
F. C. Brown.
G. T. Brown.
A. D. Bumpstead.
E. Burnett.
F. W. Burnett.
R. Byrom.
W. Carter.
J. Challice.
G. Checkley.
A. C. Cheek.
H. G. Clark.
S. C. Clark.
V. G. Cogswell.
E. Cole.
H. J. Cook.
R. A. Cordingley.
G. H. Cotton.
H. W. Couchman.
A. C. Cowtan.
E. W. Creegan.
H. H. Davies.
F. G. Detmold.
W. B. Edwards.
G. H. Fielder.
W. F. Granger.
J. H. Greenwood.
H. N. Griffith.
W. E. Guy.
T. W. Haird.
F. L. Halliday.
J. S. Hardie.
F. H. Harding.
F. Harrild.
J. H. Haughan.
J. H. Hayward.
A. A. N. Haywood.
G. T. Heard.
A. C. Holliday.
D. J. Howells.
R. Hunt.
H. C. Hunter.
H. T. Jackson.
C. M. C. Johnson.
R. H. A. Jones.
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T. L. Jones.
W. M. Keesey.
E. Kirby.
A. L. Knott.
G. A. Langdell.
E. P. Lavender.
A. P. Lay.
J. R. Leathart.
G. S. Lewis.
R. L. Luke.
N. C. Mackey.
G. E. McLeavy.
S. E. Mahon.
N. Martin.
R. J. Masey.
K. S. Meager.
C. S. G. Miller.
R. J. H. Minty.
E. A. Mitchell.
P. M. Newton.
C. J. Norton.
A. T. Owen.
G. L. Owen.
E. M. Penman.
H. J. P. Price.
L. A. G. Prichard.
V. O. Rees.
J. E. Reeves.
G. Revitt.
T. F. Rippingham.
W. Sadler.
E. F. R. Sample.
C. Scriven.
W. G. Seaton.
A. E. Smith.
C. Smith.
J. H. Sturgeon.
T. W. Sutcliffe.
R. Thorburn.
A. C. Townsend.
C. A. Trimm.
W. C. Von Berg.
R. B. Walker.
C. S. White.
H. Williams.
E. Williams.
T. J. R. Winn.

Thirty-eight candidates failed to satisfy the examiners.

The following candidates passed the Examination held in Sydney:—Intermediate: Messrs. S. J. Hurd and S. J. Traill; Special Overseas: Mr. C. C. M. Whitley; Special War: Mr. A. S. Robertson.

Stowe House, Buckinghamshire.

Stowe House, Buckinghamshire, has been offered by its owner (Mr. H. Shaw) as a free gift to the Association of Preparatory Schools for the purposes of a public school, and the Council of the Association of Preparatory Schools has appointed a sub-committee to consider a scheme for the foundation of a new public school at Stowe.

THE NATIONAL PORTRAIT GALLERY, EDINBURGH.

FOR a period since before the war until now Edinburgh has been deprived of the use of its National Portrait Gallery in Queen-street, owing to schemes of reconstruction and the rendering of the rooms fireproof, and it may be some months yet before it is available for the public. Built in the style of 14th-century Gothic, after designs of the late Sir Rowand Anderson, of warm red sandstone, it is also a home for the Museum of the Society of Antiquaries. It owes its inception and completion to the liberality of the late J. R. Findlay, of *The Scotsman*, who built it at a cost of over £80,000. It was opened to the public by the Marquis of Lothian in 1889. The hall is decorated with historical subjects by the late W. Hole, R.S.A., while niches outside are fitted with figures of famous Scots. It is a matter for regret that such an interesting collection is off the main stream of traffic and has been less often visited, say, than the National Gallery at the Mound, Princes-street. During the war period many important portraits of celebrities, including those of Burns, Carlyle, Scott, and R. L. Stevenson were transferred and hung at the Mound for a time. Primarily intended for portraits of eminent Scots, it also welcomes portraits illustrative of the history of the United Kingdom. There are some fine portraits from the brush of Raeburn, the "Scottish Reynolds," whose studio was at 32, York-place, close by. The gallery also contains a medallion by James Tassie of John Adam, architect, a son of W. Adam of Maryburgh (1721-1792), who became a partner with his younger brother Robert. There is another medallion by the same artist of Robert Adam (1728–1792), architect of Hopetoun House, near Queensferry, the old Edinburgh Infirmary, Register House, Old University, and Royal Infirmary, Glasgow. He took part along with his brother James in the construction of the Adelphi, the series of streets raised on arches between the Strand and the Thames, London. The firm was responsible for the façade of the Admiralty, Whitehall; Berkeley-square; and the restoration of Lord Mansfield's house of Caenwood, Hampstead, which estate an endeavour is at present being made to purchase for public use. A portrait of the donor of the Gallery, J. R. Findlay, by George Reid, set in a design by the late Sir Rowand Anderson, was unveiled by Lord Balfour of Burleigh in 1900.

Diagram No 6.

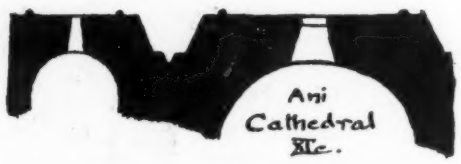


Diagram No 7.

Diagram No 8.

ELEMENTS & THEORY OF ARCHITECTURE.—I.

(Based principally upon the published lectures of Monsieur J. Gaudet, *Professeur Inspecteur Général des Batiments Civils, Membre du Conseil Supérieure de l'Enseignement des Beaux-Arts*).

BY T. P. BENNETT, A.R.I.B.A.

(Head of the Department of Architecture, Surveying, and Building, Northern Polytechnic).

MONSIEUR GAUDET was born on December 23, 1834, and died on May 17, 1908. In 1872 he was appointed patron of one of the Ateliers of the Beaux-Arts, and in 1894 became Professor of Theory and commenced the delivery of his now famous lectures, afterwards embodied in a work of four volumes published by the Libraire de la Construction Moderne, 13, Rue Bonaparte, Paris. One of the finest qualities of this book is the extraordinary humility towards his subject betrayed in quite unconscious fashion by one who was unquestionably a master. The language is characterised by clear and logical thinking and commanding powers of expression. His reasoning always appears sound, his meaning is never in doubt. It is the finest treatise on architectural design written at any period or in any language.

The scope of the work is outlined in a paragraph at the commencement of the preface:—"This course of lectures has for its object the study of the composition of buildings, in their elements and in their general arrangement, from the point of view of art and of adaptation to definite programmes and to practical necessities." The lectures were given to, and the work written for, the French student, and particularly for the student studying in Paris. The illustrations are taken as far as possible from neighbouring buildings; the great value of the study of actual buildings is emphasised, and the frequent selection of examples from a limited field is therefore deliberate. Naturally, to an Englishman, such examples are slightly less real, even if he is more or less acquainted with the buildings mentioned; but this is a minor matter. Nothing could be finer than the clear exposition of an abstract and complicated art which unfolds itself as we peruse the pages of the book. It provides at once a solid basis for the development of modern architectural design, for criticism, and for the production of sound and reasonable buildings.

It is in the hope that the book may be more widely read that these few notes have been written. For many reasons an actual translation is impossible in the pages of *The Builder*, even if such a translation were desirable, which is open to doubt. Naturally, many points arise which are not strictly relevant to English art, for the French architect must cope with difficulties which do not exist in England, and the English architect has restrictions to overcome and problems to solve which have never occurred to the French. Many things, therefore, have been modified and adjusted, much has been left out, some things have been added, but the theory which underlies the whole is the theory of M. Gaudet.

Architecture must first be considered as a profession. What does it mean? What demands does it make upon its exponents? Undoubtedly its outstanding feature is its versatility. No other profession calls for such widely varying qualities—at the same time and for the same reason no other profession provides a life so full of variety and interest and (to the man with a true architectural temperament) so intensely delightful.

The architect must in the first place possess artistic qualifications of a high order; he must be able to visualise his building, to make it a cohesive and interesting whole, to obtain good proportions, pleasing detail, and satisfactory ornament. He must be able to portray this building on paper in an artistic manner, so that his intention is clear and his conception attractive. His draughtsmanship must be so facile that drawing becomes an almost unconscious effort—the hand must follow the mind with rapidity and without hesitation. The drawing must crystallise the thought faithfully, and delineate plan, elevation, ornament, or enrichment as soon as it is conceived. The architect must have a knowledge of size and dimensions, so that his buildings and the details thereof are in proportion to the human scale. He should be able to draw to approximate dimensions without the aid of a scale, and to visualise objects in the round which are drawn in plan and elevation. These requirements demand a highly developed imagination and a large amount of artistic skill, an ability in this direction alone quite equal to that of the painter or the sculptor.

But this is only a fourth part of the knowledge required by the architect. His art is one which requires the aid of the builder for its expression, and he must be able to give such concise and clear instructions that the builders' foremen and workpeople can construct the building. This requires a practical mind of the first order. It necessitates an intimate knowledge of the principles of mechanics and their application to building problems; the use and methods of jointing employed in dealing with brick, stone, timber, slate, tile, zinc, copper, lead, steel, iron, and other materials; the capacity, strength, and general qualities of these materials, and their respective merits and defects. The extent of this knowledge is very great. Except perhaps in minute detail, it must be as complete as that of the builder.

Thirdly, the architect must possess a legal mind, to enable him to guide his client through the inevitable problems connected with the purchase of land, the framing of contracts, easements of light and air or of right-of-way, right of support, and other matters. The intricacies of the London Building Act are quite as difficult legally as they are, at times, technically, and although in some cases a solicitor may be employed in many others he is not, and even when the law is represented it is often the architect who actually solves the problem, leaving little more for the legal adviser than a mere question of phraseology.

Finally, there is the business element, both in the conduct of the practice and the arrangement and design of the building. A normal practice is large enough to require a considerable amount of business arrangement without being sufficient to justify a business manager. The sums of money handled by the architect in erecting buildings are greater than those handled by any other professional man, and they must be spent with adequate regard to their earning capacity, or the whole purpose of the building will fail, involving financial disaster to client, architect, and builder alike.

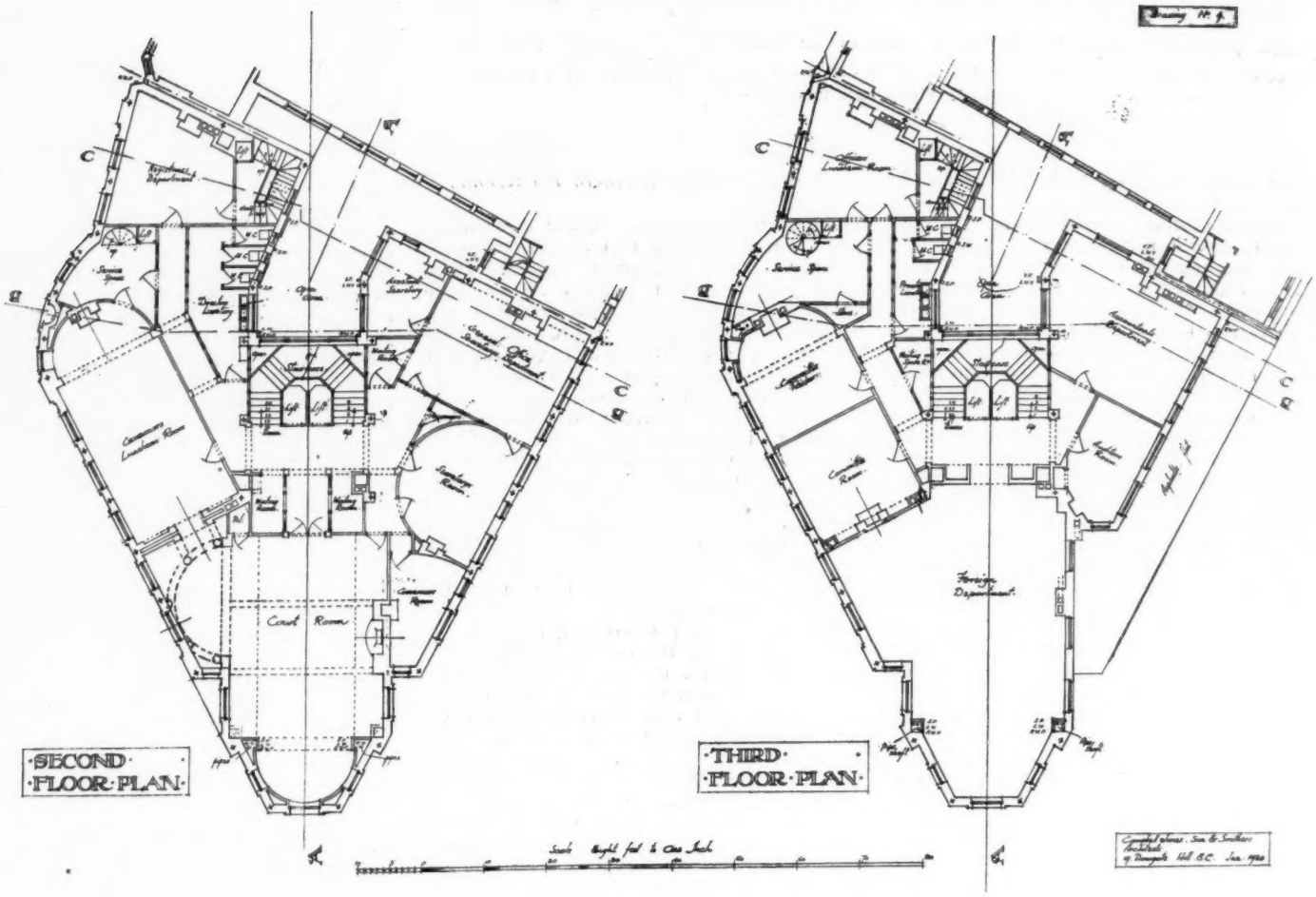
Thus is outlined the work of the architect. Thus should be outlined the work of the architectural student. It is just as false and misleading to develop exclusively the artistic faculties as it is to develop exclusively the practical, constructional, legal, commercial, or financial faculties. The ideal school curriculum, coupled with any office experience that is regarded as training, should include the whole of the subjects enumerated. A programme correctly drawn will perhaps shock the student who regards architecture as one of the professions of the arts—as M. Gaudet says to his students, "But you are impatient and, I hope, enthusiastic. You have admired our cathedrals, our châteaux, our theatres, our law courts, our town halls; and to-morrow you intend to compose in your turn some marvellous erections, to create upon your paper some plans of monuments which will be symphonies of stone and marble! . . . Slowly!"

There is in architectural education a definite place for art, science, law, and commerce. "Practically, as others have found, science will be necessary in your studies, and in your career; its position will always be secondary, for it is not science which will give you imagination, artistic ingenuity, invention, or taste, but without it you will only be able imperfectly to measure the value of these qualities, realise your conceptions, or study your designs in all their details."

This is the case against a purely artistic training. The architect's career is not concerned with brilliant representations on paper, but with the production of actual buildings. Architecture is the art of construction, not of drawing, and no architect can build who has not studied exhaustively methods of construction, accurate specification writing, interpretation of by-laws, contracts, and other similar matters. Even in the matter of pure design the aim should be rather in the direction of accurate delineation than pictorial representation. It is much more important to know exactly how a console is shaped or an enrichment carved than to be able to give a brilliant representation of its effect in pencil or watercolour. The pleasure to be derived from fine draughtsmanship is, of course, undeniable, and therefore to be encouraged for its own sake, but it is not the necessary route to the serious study of architecture. If, however, the architectural student has realised the true conception of architecture, which is the production of fine buildings perfectly fitted to their purpose, and if architecture is his true vocation, he will find just as much interest in his practical studies as in his artistic work. Construction will have as strong an appeal as design. He will make rapid progress because he has no bad habits to lose and no defective efforts to forget.

An Old Doorway Restored.

[This porch and door in Southampton-street, W.C., has been restored by Messrs. Mullen & Lumsden, Ltd., of South Norwood. The doorway is 180 years old, and in cleaning it down successive layers of paint to a thickness of three-sixteenths of an inch were removed.]



New Offices for the London Assurance Corporation, King William-street, E.C.

MESSRS. CAMPBELL JONES, SON & SMITHERS, Architects. [See also inset illustrations.]

SOME MINOR PROBLEMS OF A GREAT BUILDING:

IMPERIAL DELHI SECRETARIATS.

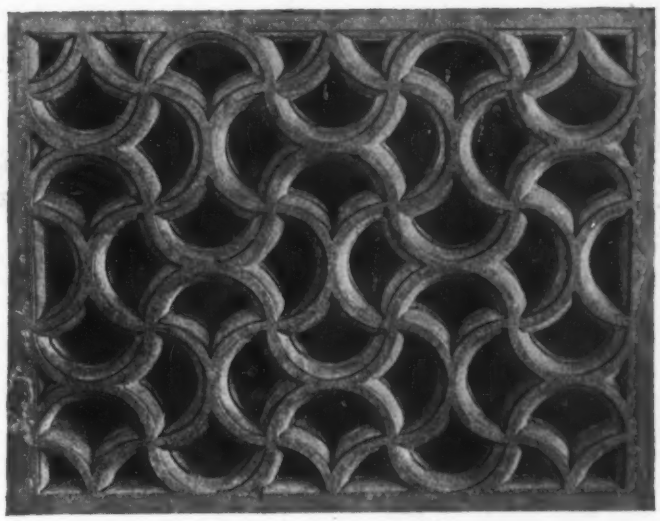
BY WILLIAM HARVEY.

EARLY in 1913 a great deal of interest was aroused concerning the style of the architecture to be adopted in the buildings of the new capital city of India at Delhi, and two rival camps alternately advocated a purely Indian or a purely European type of design. The Orientalist party expressed a wish that the native master builder should be permitted to follow the immemorial traditions of his art and design as he built in one of the many styles exhibited in the ancient buildings of India. The other party, stating the question more bluntly, "Are we to build as Englishmen or Orientals?" asserted that the Renaissance style which had been in use in England since the time of Inigo Jones and Wren was the only suitable style for English buildings in India.

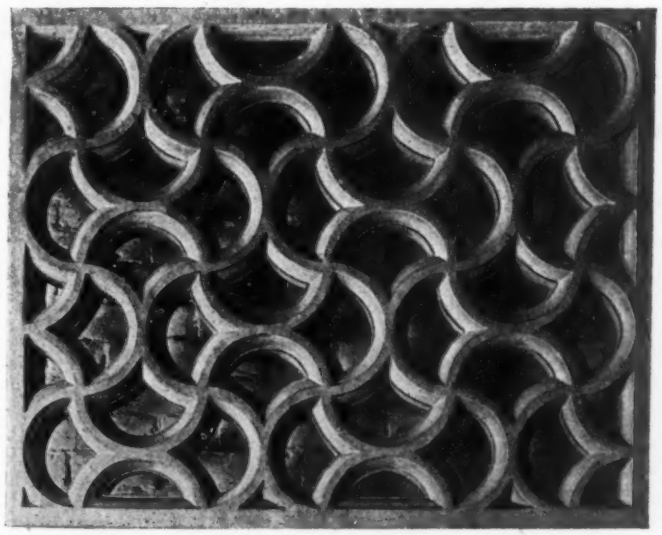
That part of the work which was given ultimately into the hands of Mr. Herbert Baker, F.R.I.B.A., includes the two gigantic blocks of buildings for the Indian Secretariats, now in course of erection. These may be regarded as designed in accordance with the greater and more elemental principles of classical style carefully adapted to suit the heat of the climate and to incorporate, wherever practicable, such elements of traditional Indian architecture as could be successfully made to harmonise with the administrative needs of the scheme. It may be said at once that the concessions to Oriental effect were in the nature of simplifications rather than additions, the general effect of the buildings being massive and dignified and resembling the Indian work of former centuries rather than the complex and detailed productions of present-day attempts in Indian architecture.

Mr. Baker brought to the task the results of his long experience in the design of buildings for hot climates, but the local traditions also received his earnest and sympathetic attention. The stately lengths of retaining wall upon which the buildings stand and the general simplicity of their fronts exemplify the Oriental feeling for continuity of structure, and the cornice to be erected at the summit of the walls is designed upon the lines of an Oriental *chujja* or projecting ledge of downward-sloping slabs, whose purpose is to cast a great cooling shadow upon the faces of the walls below and to protect the building from the tropical rain-storms. This intermingling of styles is based upon a rational interpretation of the actual needs of the building, and was not arrived at without exhaustive consideration with the help of sketches, models, geometrical drawings, or even of full-size sample buildings erected on the site itself. One Oriental feature which it was hoped might be incorporated freely in the design was the *jaali*, or screen of perforated stone or marble, for the native craftsman had kept alive the tradition of the geometrical patterns involved in this beautiful art for his own purposes. The patterns had to be adapted, however, to the sizes of the window openings to be fitted with these interesting screens, and, in the end, the designs of typical units had to be produced under Mr. Baker's own supervision after exhaustive study of the ancient patterns; failing this a good pattern might easily be spoilt by an arrangement which allowed its interest to wander without adequate concentration upon the central point of the screen, or, if correct in this respect, the scale might involve apertures either too large or too small to harmonise with other jaalies already approved. A *jaali* satisfactory in both these particulars would still be hopelessly wrong if the shapes of its perforations were cut unpleasantly by the border lines of solid material enclosing the perforated panel. It will be seen that the knowledge necessary to enable the craftsman to cut his geometrical pattern has to be supplemented by direction from the architect on important points of selection, scale, and treatment before the *jaali* can take its place in the architectural scheme. How largely discretion enters into the matter may be seen by comparison of the three sample slabs dealing with the same simple pattern made to fill a similar space in three different ways. In "A" attention is drawn to the perforated spaces arranged symmetrically about the centre of the slab; in "B" the whirling lines of the moulded bars form the architectural interest; while in "C" the whole design is reduced to commonplace by the fact that the pattern has been distributed upon the slab without reference to its central point.

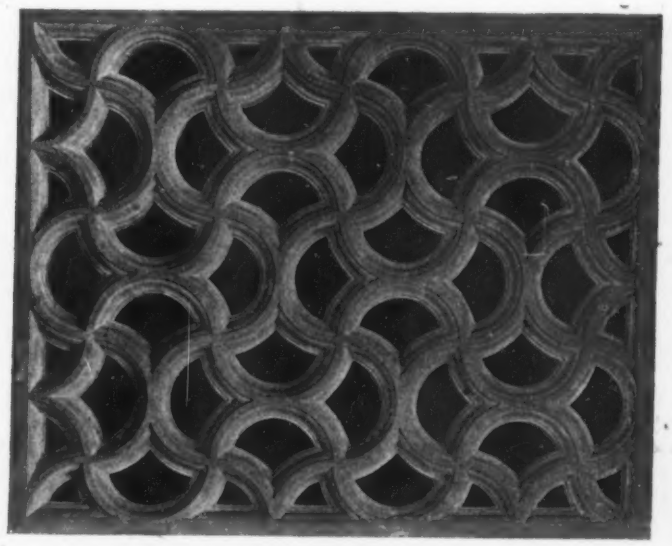
It should be mentioned that this very simple geometrical pattern was used as an illustration to teach the elements of *jaali* management to those concerned upon the spot, and some such educational process is required by all who venture to adapt the elements of foreign style to



EXAMPLE "A" OF PIERCED STONEWORK SCREEN (OR "JAALI") TO ADMIT AIR WHILE SCREENING OUT THE SUN.
Imperial Delhi Secretariats.

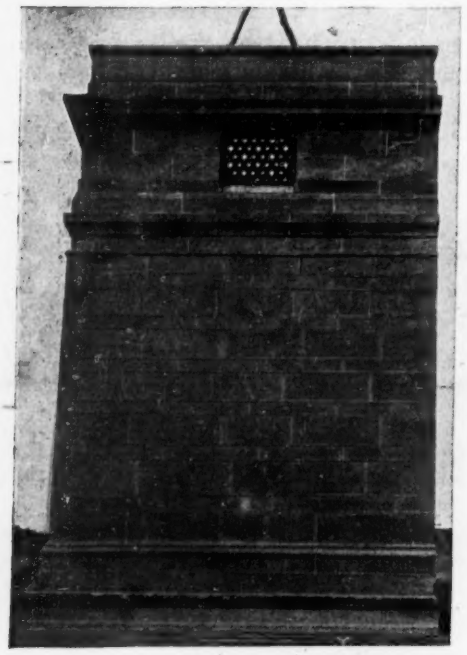


EXAMPLE "B" OF PIERCED STONEWORK SCREEN: NOTE WHIRLING LINES PROMINENTLY IN CENTRE OF PANEL.



EXAMPLE "C" OF PIERCED STONEWORK SCREEN: SHOWING COMMONPLACE EFFECT OF DESIGN WHEN NOT FOCUSSED ON THE CENTRAL POINT OF THE PANEL.

Imperial Delhi Secretariats.



SAMPLE BLOCK OF MASONRY BUILT TO ASCERTAIN EFFECT OF BATTER, MOULDINGS, AND JOINTING.

Imperial Delhi Secretariats.

a building which in the main claims kinship with the work of Sir Christopher Wren. The material of construction had its effect in modifying the original design of the building. A hard local quartzite employed in some of the basement courtyards proved intractable, and the contours of brackets and corbels were simplified to suit its hard crystalline composition, with admirable results. On the other hand, the installation of a special brickfield enabled small moulded bricks to be used in the interior of the building in courtyards and corridors that otherwise would have been finished in plaster.

For this portion of the work it was necessary to find the clay and to discover its factor of shrinkage in drying and burning before the moulds could be made for mass production. Flat ceilings of reinforced concrete were made the subject of considerable experiment, for the rapid evaporation of water from the newly-deposited compost threatened to deprive it of a great part of its tenacity. Beams of this material were successfully produced and immersed in water in the long ornamental tanks or fountain basins of the town-planning scheme. The beams were lifted by cranes moving on rails laid parallel to the length of the tanks. This method successfully overcame the evaporation difficulty, but necessitated an extraordinary amount of reinforcement, since a beam which will be supported by its ends when fixed in the building has to be slung by the middle in a variety of different positions before arriving at its correct resting place on the walls.

The employment in the building of vaulted chambers and corridors led to some interesting experiments in the construction of these enduring architectural forms. In many cases these vaults have been executed in brick and mortar without temporary "centres," the work being carried on according to the methods described by M. A. Choisy in his "L'Art de Batir chez les Byzantines."

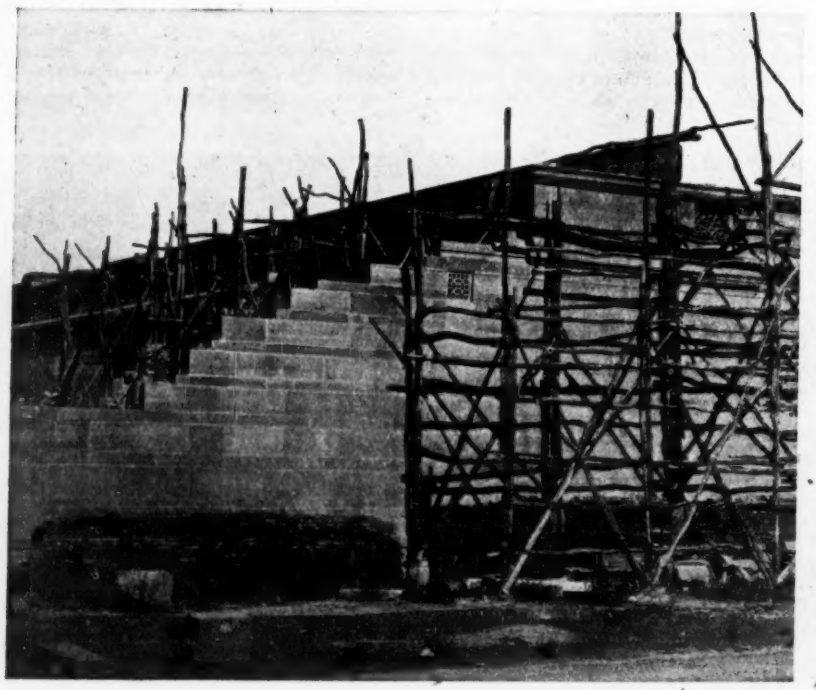
In cases of repetition it has been found more economical to employ temporary centres, but for single domes of moderate span the Byzantine methods have been found quite adequate and suitable to the class of labour employed. A certain amount of corbelling-out is used in the lower part of the vault, and the central eye is closed by the workpeople actually holding the bricks in position until they are retained in place by the setting of the mortar.

An attempt is being made to revive the glorious Indian industry of tile-making, but unexpected difficulties have been encountered. Analysis of the colouring matter of good old tiles shows that the pigments possessed slight impurities from which modern ones are free, and the superior quality of the hues in the old tiles seems to have been due to these minute traces of foreign matter. Present-day methods, too, often result in a glazed surface of extreme brittleness, which flakes away and leaves the bare clay of the tile exposed. An assembly of master tile-workers was arranged to remedy these defects, but the meeting dissolved without anything having been accomplished. Each craftsman feared that his cherished secrets would be revealed to his rivals, and returned home without waiting to see what he might learn in the general discussion or from the explanation of modern scientific methods.

The freedom of movement permitted to workers under British rule in India creates a difficulty, for a man who has been carefully trained for some branch of work upon the great building flits away irresponsibly from Delhi upon hearing of more remunerative work elsewhere. In some native States good craftsmanship on the old lines may be seen at the present day, but there the worker is frequently obliged to produce evidence of his skill as a condition of his tenancy of his house and lands, a feudal arrangement which may seem quaint and out of date in these democratic times, but which is eminently successful from the artistic point of view.

EXPERIMENTAL OFFICE DOOR IN INTERNAL CORRIDOR.

Imperial Delhi Secretariats.



"S" BLOCK, EAST ELEVATION: S.E. PAVILION AND JUNCTION WITH STABLE WALL.

Imperial Delhi Secretariats.

LIABILITY OF PUBLIC AUTHORITIES:

Public Parks.

THE case City of Glasgow Corporation *v.* Taylor (*Weekly Notes*, November 26), heard in the House of Lords, is of considerable importance to local authorities who own public parks and who are doing much to contribute to the public pleasure by ornamental planting. The Corporation (the appellants) in this case owned and controlled the Botanic Gardens at Glasgow, which were open to the public as a park, and adjoining the playground and bandstand was a plot of ground in which specimen shrubs were grown. Among these shrubs was one which bore poisonous berries. This plot was fenced in, access being obtained to it by a gate, but it was open to the public and the gate could easily be opened by a child. The plaintiff's son, a child of seven, with other children, had entered this plot and eaten some of the berries. The plaintiff's son died from this cause, and the plaintiff brought an action for his death against the Corporation.

The court of first instance in Scotland had held that no cause of action was disclosed, but the Scotch Court of Session (Second Division) had held there was a case to go to a jury. The House of Lords has affirmed this decision, and the important facts which the House laid down in coming to this conclusion were: (1) That the children were entitled to go to the spot where the shrub was grown, (2) that no warning was given to parents or those who had the custody of the children that the danger existed, and (3) that the danger was known to the Corporation. The House of Lords held that the case was governed by the principles laid down in Cooke *v.* Great Western Railway (1909, A.C. 229) and by Lord Sumner in Latham *v.* Johnson (1913, 1 K.B. 398). In a note dealing with this subject in our issue for March 24, 1916, we drew attention to the fact that in public places the presence of children has to be borne in mind, and the highest degree of care has to be exercised not to expose them to risks.

PREMISES, OXFORD-STREET, W.

MESSRS. FORBES & TAIT, Architects.

PREMISES, TOTTENHAM COURT-ROAD, W.C.

MESSRS. DUNBAR SMITH & BREWER, Architects.

No. 11, GREAT MARLBOROUGH-STREET, W.

MR. FRANK R. ATKINSON, Architect.

No. 187, PICCADILLY, W.

MESSRS. CHESTON & PERKIN, Architects.

NORWAY HOUSE, COCKSPUR-STREET, S.W.

MESSRS. F. T. W. GOLDSMITH & J. T. WESTBYE, Architects.

GENERAL ELECTRIC PREMISES, KINGSWAY, W.C.

MR. FRANK R. ATKINSON, Architect.

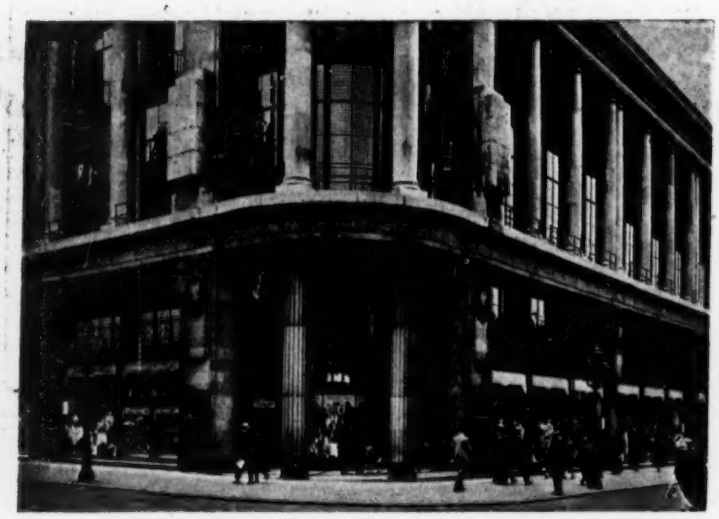
LONDON SHOP FRONTS.

No. 29, COCKSPUR-STREET, S.W.
MESSRS. MEWÈS & DAVIS, Architects.

No. 50, BERNERS-STREET, W.
MESSRS. JOHN SLATER & KEITH, Architects.

DICKINS & JONES' PREMISES, REGENT-STREET, W.
MESSRS. HENRY TANNER, Architects.

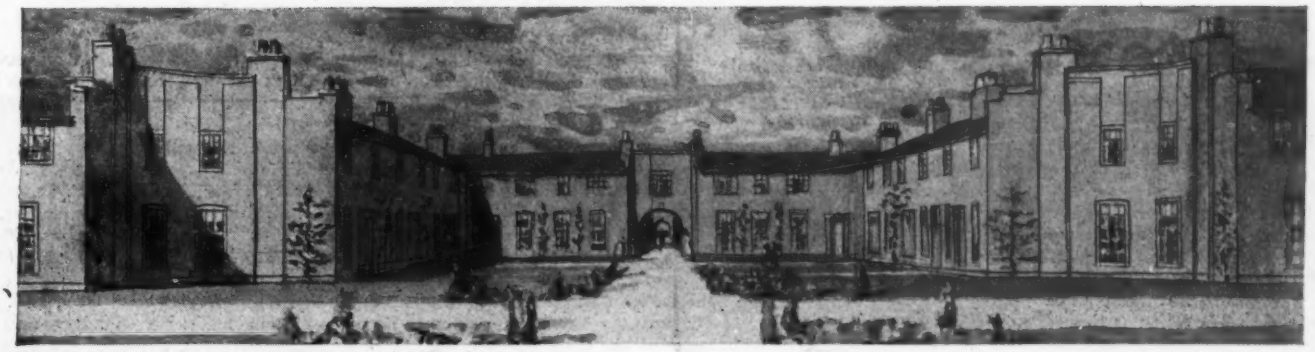
PREMISES, HIGH-STREET, KENSINGTON, W.



WHITELEY'S, QUEEN'S-ROAD, BAYSWATER, W.
MESSRS. JOHN BELCHER & J. J. JOASS, Architects.

No. 144, NEW BOND-STREET, W.
MESSRS. LANCHESTER & RICKARDS, Architects.

LONDON SHOP FRONTS.



From a drawing by Mr. Edgar Wood.

Fairfield Housing Scheme.—MR. J. HENRY SELLERS, Architect.

[This scheme was carried out by Messrs. Fairfield Tenants, Ltd., employing direct labour. Common bricks were used, with Ravenhead coigns to doors and windows, and grey Burlington slates for the roofs. The houses were built between 1912–13. Mr. J. Henry Sellers, of Manchester, is the architect.]

THE MANCHESTER SOCIETY OF ARCHITECTS.

As reported in our issue for December 23, the annual dinner of the Manchester Society of Architects was held at the Queen's Hotel, Manchester, on December 13, Mr. A. W. Hennings (President) in the chair. There was a good attendance of members, and the guests present included the Right Hon. the Lord Mayor of Manchester, Mr. Paul Waterhouse, P.R.I.B.A., Sir Henry Miers (Vice-Chancellor of the University of Manchester), and Mr. Francis Dodd.

In response to the toast of "The Royal Institute of British Architects" (proposed by the Chairman), Mr. Waterhouse said the subject which was very much in his mind, and in theirs, was the scheme of unification. When one spoke in the hearing of strangers on that question one was in danger of conveying the impression that the body of architects was "by schisms rent asunder." As a fact, they were perfectly united, and most of their outside friends did not know what "unification" was. It was really a question of rearrangement. Let no one think that the unification scheme was the hobby of some London leader, pushed upon the Council in London, and then launched upon an astonished and uninterested general body. The genesis and the growth of the movement had been quite other than that. It had been born of a wise expectancy in many minds, and it was deliberated on by a committee formed of the most heterogeneous elements, drawn, in fact, from all classes of practitioners, both within and without the confines of the Institute and the Society of Architects. Finally, it was brought to its present development by the exercise of generous and large-minded unselfishness among men all over the British Isles. If the movement had in any kind of sense been worked from London, then London had cause to be very grateful for the support of non-Metropolitan centres; but, as a matter of fact, the movement was general, and the activities of London could fairly be described as London's doing its duty as fulcrum to a force at the business end of the lever. Not that any one ought to forget the heroic and tactful services of his friend and predecessor, Mr. Simpson, together with Sir Charles Ruthen and his colleagues of the Society of Architects.

Speaking on the subject of education, he paid a tribute to Manchester's conspicuous share in the educational movement, and to the services which Professor Dickie had continuously rendered on the Board of Architectural Education. It was, he said, sometimes suggested that architects were in danger, by means of the very excellence of their educational system, of overstocking the profession. It was suggested, too, that there were more persons already in the profession than could very well be supported by it. He felt they must with confidence leave that largely in the hands of the teachers of architecture, who, if they were convinced that there were young men in the schools who would be more likely to make a living in other spheres than in architecture, would, he was sure, in the future, as in the past, use a wise discretion in advising the removal of the unsuitable. Then, in connection with architectural schools, it was suggested they were in danger of becoming too academic. There were some very fine teachers in the architectural schools, and they need have no fear, in his opinion, on that head. There had been in the past too little of the academic. All that was needed now was caution lest the constructional side of the teaching lost its proper balance and proper connection with the compositional.

RENT AND LANDLORD'S PROPERTY TAX.

In our issue for June 30, 1920, we drew attention to the case Hill and Others *v.* Kirshenstein (1920, 3 K.B. 556), in which it was held by the Court of Appeal that where a person has paid the landlord's property tax which he is entitled to deduct from his rent that deduction must be made from "the next payment of rent" under section 211 subsection (2) of the Income Tax Act, 1918. In a recent case, Kirk *v.* Cunnington (1921, 3 K.B. 637), a county court judge held that a tenant can only deduct property tax for the current financial year, but the divisional court has held that this view is erroneous, and has decided that where a tenant has made no payment of rent for, say, two years and then pays the rent for that period that payment is "the next payment of rent," and the property tax paid by the tenant can be deducted for both those years.

It is, of course, unusual that tenants should be in arrear with their rent for so long a period, but it is well that tenants should note this decision. In the case before the court the payment of rent had been complicated by certain services performed by the tenant which had to be taken into account and by certain payments from another source, but we only refer to the question of law decided.

From a drawing by Mr. Edgar Wood.

Proposed Housing Scheme at Middleton.—MR. J. HENRY SELLERS, Architect.

[This scheme is in abeyance, but is intended to be carried out in selected common bricks and Delabole slates for the roofs. The architect is Mr. J. Henry Sellers, of Manchester.]

THE ROYAL AIR FORCE CLUB, PICCADILLY.

THE Royal Air Force Club, which is situated at No. 128, Piccadilly, W., is now practically completed, and is in occupation by members. The club owes its existence to the munificence of Lord Cowdray, who during the war promised to give to the Royal Air Force a West End club house, furnished and equipped complete, as soon as the war was over and conditions made a fulfilment of this project possible. The building consists of the two houses lately occupied by the Ladies' Lyceum Club, and also a large extension behind on the site of Milton's-yard. The Lyceum Club building has been largely remodelled and an additional floor of bedrooms added to it. The building on Milton's-yard used as a riding-school was demolished and entirely rebuilt as an addition to the original Piccadilly building. During building operations several pewter tankards of the 18th century were dug up, bearing the inscription, "The Running Horse," probably one of the old coaching houses. These are in the hall of the new Club to-day.

Building operations commenced on September 8, 1919, and were confined at first to reconstructing the Piccadilly building with a view to its occupation in the summer of 1920, but in the meantime the negotiations for a long lease of Milton's-yard matured and Lord Cowdray decided to complete the whole building forthwith. The work was continued as far as possible on the portion that had been started, while final plans were prepared for the new additions on Milton's-yard. After many difficulties of rights-of-light, strikes, high prices, and other troubles, the new buildings were begun in the early part of 1921, and under the contract are due to be finished on January 31 next.

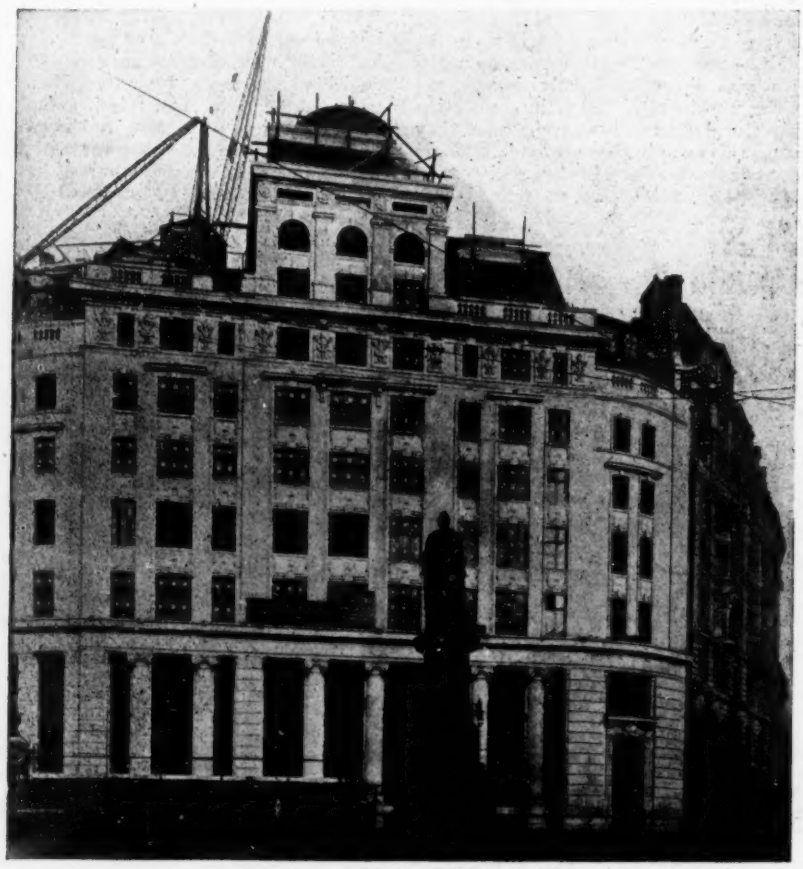
If the planning of these buildings differs from that of other club buildings it is in an attempt to meet the modern requirements of club members, who, in addition to the ordinary amenities of a London Club, desire some of the additional advantages of an hotel, and also facilities for taking exercise. To this end the Piccadilly portion of the building is entirely devoted to club life, with access from the main entrance in Piccadilly to the large dining, smoking, writing, billiard, card, and other club rooms. The dining-room on the Piccadilly front, extending over the whole length of the building with a magnificent view over the Park, is one of the attractions of this part of the Club. The ground floor of the Lyceum Club was practically gutted to form the entrance lounge and the principal members' smoking-room, extending from the front to the back of the building. In Park-lane there is a separate entrance for the use of members living in the Club or arriving with luggage, and close to this is a bureau, telephones, secretary's office, &c., where the business of the Club is carried on. From this entrance a large ball-room on the first floor, the ladies' section of the Club, and two squash-racquets courts are reached, so arranged that they may be used without interfering in any way with the members' club-rooms in the front of the building but connected on the principal floors for convenience of access by the main corridors, which have been treated by the architects to form an architectural feature of the building.

On the upper floors, in addition to 70 members' bedrooms, with a full complement of bathrooms, a suite of rooms for private dinner parties, a barber's shop, and men servants' accommodation have been provided, reached by electric lifts and staircases from both the Piccadilly and Park-lane sections of the building.

Care has been bestowed on the kitchen and service arrangements generally, which are very complete and up-to-date, and also the comfort of the Club's servants, who here have recreation-rooms, dining-rooms, and sleeping accommodation.

The new parts of the building are fireproof throughout, and the whole is equipped with low-pressure heating, electric light and power, electric clocks, lifts, vacuum cleaners, and a complete telephone installation. Refrigerating plant for ice-making and storage is also included in the equipment.

The architects for the building are Sir Aston Webb, P.R.A., and Son. Messrs. Trollope & Colls are the general contractors, and have also made the furniture for the public rooms to the architects' designs. Other contractors employed on the building and its equipment are:—Dent & Hellyer, Ltd. (plumbing), Jeffreys & Co., Ltd. (heating and hot-water supply), G. Jackson & Sons, Ltd. (decorative plasterwork), Shuffrey & Co., Ltd. (mantel-pieces and fireplaces), "Durato" Co., Ltd. (composition jointless flooring), Art Pavement & Decorations, Ltd. (marble paving), Bickleys, Ltd. (squash-racquet courts), Cope & Co. (tiling), Waygood-Otis, Ltd. (lifts), Benham & Sons, Ltd. (kitchen fittings and quick-lunch counter fittings), British Vacuum Cleaner Co., Ltd. (vacuum cleaner installation), Haywards, Ltd. (fire-escape staircases), Merryweather & Sons, Ltd. (fire appliances), Dyer & Jarvis, Ltd. (fittings for barber's shop), Magneta Time Co., Ltd. (electric clocks and clock cases), Bainbridge Reynolds, Ltd. (metal work), Thurston & Co., Ltd. (billiard-tables and accessories), Perry & Co. (electric light fittings), Harris & Sheldon (steel lockers), Farrow & Jackson, Ltd. (wine-cellar fittings), British Refrigerating Co., Ltd. (refrigerating plant).



New Premises for the Guardian Assurance Co. and Lloyds Bank, Ltd., King William-street.

[MESSRS. CAMPBELL JONES, SON & SMITHERS, Architects for Lloyds Bank; MR. H. L. ANDERSON, Architect for the Guardian Assurance Co.]

HOUSING AND TOWN-PLANNING NOTES.

Housing at Greenock.

The Greenock Corporation has received intimation from the Scottish Board of Health that an additional 200 houses may be built in Greenock under the State-aided housing scheme. The Corporation had a scheme for the erection of 120 houses at Upper Cornhaddock advanced to the stage of having the tenders in the hands of the Board of Health when intimation was received that the work could not proceed. The first step in the erection of the 200 houses will therefore probably be the carrying on with the Upper Cornhaddock scheme, and fresh tenders will probably be called for.—There is a proposal to erect recreation rooms and a gymnasium with two dwelling-houses in the same building for the members of the police force near the entrance to one of the public parks. The Borough Surveyor of Greenock is Mr. Robert Millar, Office of Public Works, Municipal Buildings, Greenock.

Sheffield Housing Scheme.

The Sheffield Corporation proposes to erect a further fifty houses on the Stubbin Estate, Firth Park, Sheffield. The Architect to the Corporation is Mr. F. E. P. Edwards, Town Hall, Sheffield.

Darfield Housing Scheme.

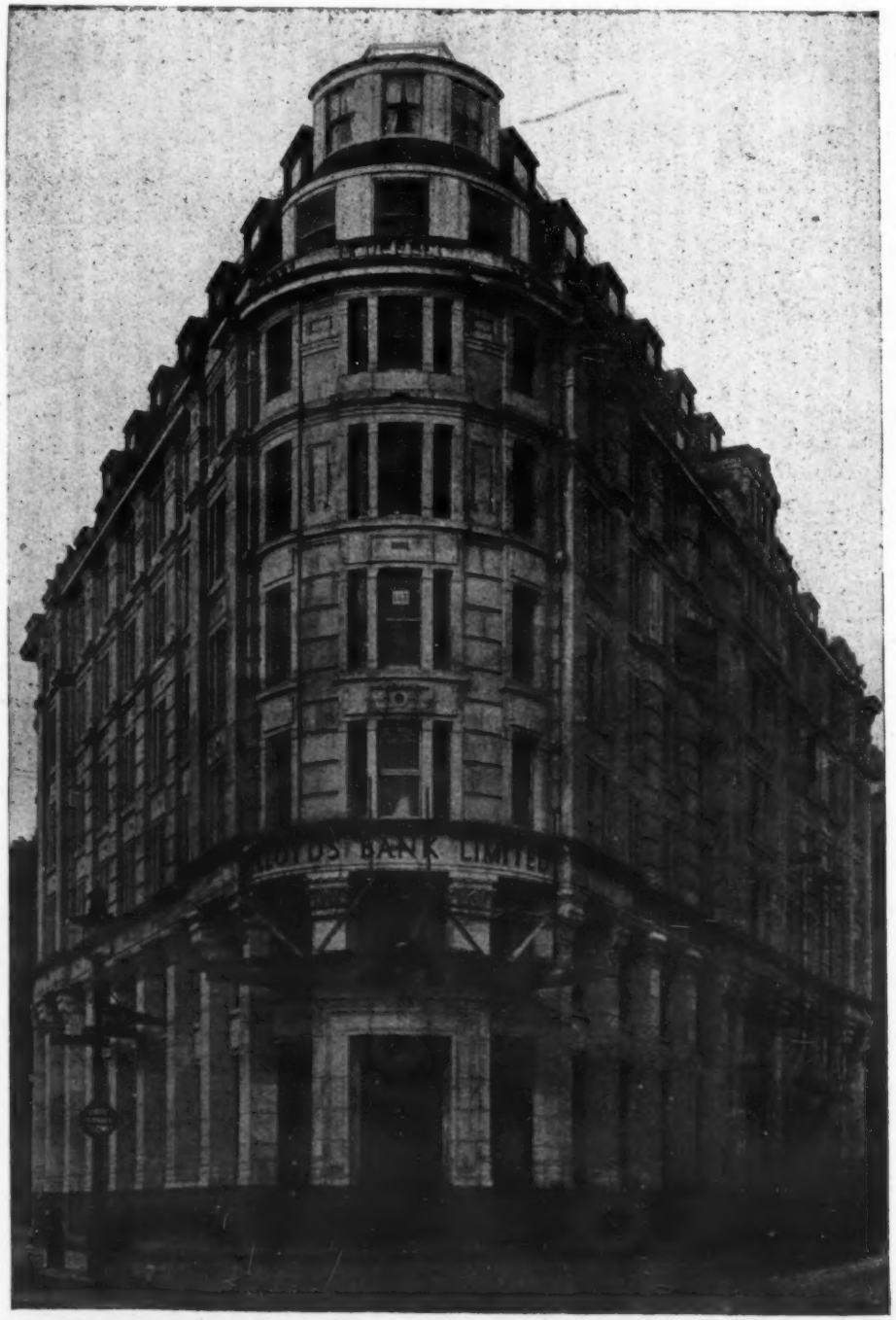
The Darfield Urban District Council is about to build twenty-four houses upon a site along the Doncaster-road. The architect is Mr. H. Smith, of West Hall, Wentworth, near Rotherham.

Assisted Housing Schemes.

The Minister of Health has issued a regulation substituting the following paragraph for paragraph (5) of Article III of the Local Authorities (Assisted Housing Schemes) Regulations, 1919 (*b*): "(5) An assisted scheme or part of an assisted scheme shall be deemed to have been carried into effect at the date on which all the houses to be provided or acquired thereunder are let or available for letting, or on which the final expenditure authorised by the Minister for the purpose of carrying the scheme or the part of the scheme into effect is incurred by the local authority, whichever is the earlier date."

Northampton Town-Planning Scheme.

Under the provisions of the Housing, Town-Planning, &c., Act, 1919, the Northampton Town Council has been recommended by its Housing and Town-Planning Committee to prepare a town-planning scheme for the area comprising the borough of Northampton (excluding the central portion), and portions of the rural districts of Northampton, Brixworth, and Hardingstone. The town-planning proposals are being prepared by Messrs. T. H. Mawson & Son.



Stafford House, Cannon-street and King William-street, E.C.
MR. MARCUS E. COLLINS, F.R.I.B.A., Architect.

Business Premises in King William-street, E.C.
MESSRS. THOMPSON & WALFORD, Architects.

THE BUILDING TRADE.

COMPARISON OF PRICES OF BUILDING MATERIALS IN JANUARY, 1921, WITH CURRENT PRICES.

We have again compiled a table to show the prices of the principal building materials at the present time as compared with the prices ruling in January, 1921. It is gratifying to note that practically all the articles reviewed have fallen in price, as indicated in the forecast in our issue for July 1, 1921. The greatest reductions have been made in the timber and steel markets :—

Material.	January, 1921. £ s. d.	January, 1922. £ s. d.	Fall per cent.
Bricks—			
Best Stocks	5 1 6	4 13 0	8·37
Flettons	3 17 0	3 12 0	6·49
Glazed	29 10 0	26 0 0	11·86
Thames ballast	0 19 6	0 14 0	28·20
Thames sand	1 5 6	0 19 0	25·49
Shingle (¾ in.)	1 4 6	0 19 0	22·45
Portland cement	4 7 6	3 17 6	11·43
Ground blue lias lime	3 12 6	2 12 0	28·28
Grey stone lime	3 15 0	3 5 0	13·33
Bath stone	0 3 2¾	0 3 2¾	—
Portland stone	0 4 11½	0 4 11½	—
Good Sound Building Timber—			
4″×11″	67 10 0	36 0 0	46·67
3″× 7″	47 10 0	25 0 0	47·37
3″×11″	65 0 0	34 0 0	47·69
2″×11″	65 0 0	32 0 0	50·77
2″× 7″	47 10 0	23 0 0	51·58
3″× 4″	47 10 0	20 10 0	56·84
Slates—			
24″×12″	56 10 0	46 10 0	17·70
22″×12″	46 0 0	42 5 0	8·15
R.S. joists	34 0 0	14 10 0	57·35
Iron—			
Common bars	34 10 0	15 0 0	56·52
Mild steel bars	32 10 0	13 10 0	57·81
Steel bars	32 0 0	13 10 0	57·81
Cut nails	45 0 0	26 0 0	42·22
Sheet lead	39 0 0	36 0 0	7·69
Glass—			
15 oz. sheet	0 0 6	0 0 4½	29·17
21 oz. sheet	0 0 8	0 0 6¼	21·87
26 oz. sheet	0 0 10	0 0 7¼	27·50
Raw linseed oil	0 4 8	0 3 2	32·14
Turpentine	0 9 10	0 6 1	38·14
Ground English white lead	69 5 0	58 0 0	16·25
White lead paint	96 0 0	77 5 0	19·53
Red lead	50 0 0	41 0 0	18·00

THE INDUSTRIAL LEAGUE AND COUNCIL.

The following series of lectures has been arranged by the Industrial League and Council to take place at Caxton Hall, S.W.1, at 7 p.m., on the dates given :—January 4 : Mr. J. E. Tuke on "The Solution of the Unemployment Problem"; January 11 : Mr. Robert Stelling on "A Fair Day's Work for a Fair Day's Pay"; January 18 : Mr. Robert Young, O.B.E., M.P., on "Use and Abuse of Combines and Trusts"; January 25 : Mr. F. Hughes on "Conditions of Industrial Harmony"; February 1 : Mr. Hamilton T. Smith on "The Curse of Work"; February 8 : Professor A. W. Kirkaldy, M.A., on "Industrial Unrest. Does it make for Progress?"; February 15 : Sir George Paish on "Industry and its Relation to Finance"; February 22 : Mr. Roy Horniman on "A Proposed Solution to the Transport Problem"; March 1 : Mr. Hilderic Cousens on "The Purpose of Economic Activities"; March 8 : Miss B. Voysey, B.A., on "The Personal Factor in Industry"; March 15 : Mr. W. Piercey, C.B.E., B.Sc., on "Psychology in Industry"; March 22 : Rt. Hon. G. N. Barnes, C.H., M.P., on "Some Common Fallacies on Trade and Industry"; March 29 : Major Isidore Salmon, C.B.E., D.L., on "The Necessity for Educating the Worker in Industrial Economics." Admission is free to all meetings, and no tickets are necessary.

DARLINGTON AND DISTRICT MASTER BUILDERS' ASSOCIATION.

The Darlington and District Master Builders' and Allied Trades' Association held its annual meeting at Darlington on December 21, when the following officials were appointed for the coming year :—Mr. G. Mackenzie (President); Messrs. C. J. Todd and A. M. Betts (Vice-Presidents); Mr. R. T. Snaith (Treasurer); Messrs. H. Rowell and J. W. Newton (Auditors); Messrs. W. E. Stairmand, J. Culley, G. Dougill, G. Brown, W. H. Hall, H. G. Hutton, A. Armstrong, T. Rodgers, and J. W. Richardson (Members of Committee). Board of Representatives : Messrs. T. Rodgers, W. E. Stairmand, A. H. Betts, and J. Guthrie. Reserves : Messrs. H. S. Hutton and G. Brown. Regional Area Council : Messrs. T. Rodgers and G. Mackenzie. Darlington Area Council : The President, Vice-Presidents, and Mr. W. E. Stairmand. Dilution Committee : Messrs. G. Mackenzie, T. Rodgers, H. S. Hutton, E. Thwaites, and W. H. Lancaster. Secretary : Mr. J. F. Place, Lloyds Bank Chambers, Darlington.

FORESIGHT AND BUILDING COSTS.

(Contributed.)

It is a common belief among the lay public that a simple building designed by an architect is more expensive, accommodation for accommodation, than one constructed by a builder without outside assistance, and that in such a building the benefits to be derived from the professional man's training and vision are negligible. This latter proposition is certainly open to question every time, but the first is often difficult to combat, and undoubtedly cost is often incurred through a detachment between the points of view of the actual constructor and the theorist, whose training, which enables him to see the wood in spite of the trees, often blinds him to the importance of individual trees which are to the fore in the vision of the constructor.

A period of past industrial prosperity and cheap and plentiful labour has somewhat blinded the world to the problem which was most in mind a century ago—cheap building. At no period of the world's history was there so much building activity at so low a cost and with such satisfactory results to all concerned, and this was largely because the divorce between the constructor and the designer had not been made absolute. To build economically again this divorce must be annulled; the designer must fully understand the processes of construction (not only its theory), and the constructor must appreciate the wider vision and co-ordinating and conceptive powers of the designer.

Two years ago the word standardisation was in everybody's mouth, although the spirit of the process had by no means permeated general thought, but this spirit is essential to the designer who wishes to get, but does not get, a reputation for economical building, and to prove that the employment of professional advice leads not only to large future economies in working costs but to an actual reduction in initial outlay. The larger principles of economy are, of course, generally recognised and acted upon, but—and here, it is to be feared, the training in our schools is partly to blame—it is not sufficiently recognised what labour-saving machines the builder has at his disposal and how they can be used to the best advantage; what is the organisation of a building firm; how great an economy can be effected by working to brick dimensions and timber as purchased and by reducing the number of rods for the joinery to the minimum; the relative cost of work on the site and in the shops not only in its production but by the contemporaneous preparation of the parts of the building; and the great reduction in time of erection which may be effected. This leads to the point where the architect can effect great economy in his building by thinking well ahead, settling everything before the work starts or immediately after, allowing the constructor to leave holes for pipes, provide fixing for joinery where it is required, and eliminate all cutting away and some of the making good. This alone would mean a cut of at least 10 per cent. in building costs, and to work contemporaneously on the finishings while the construction is in progress would mean another 10 per cent. cut in costs.

American practice has pointed these lessons, which have been learnt by many architects in this country who from their own experience can confirm the saving effected, but the result has only been obtained by hard, concentrated work in the early stages of the building and a capital outlay in place of the steady preparation of details as demanded by the builder during the progress of the work. The result, however, is not only cheaper building but better design; that feeling of losing the threads is abolished, and the finished product has a unity and grip that was sometimes lacking in a design evolved over a long period of time, with the almost unconscious changes in outlook due to natural receptiveness and keenness of intellect.

ELECTRIC PASSENGER LIFT EQUIPMENT FOR MODERN BUILDINGS.

BY RONALD GRIERSON, A.M.I.E.E., A.M.I.Mech.E.

Introduction.

IN view of the present tendency to increase the maximum height of modern office, hotel, and similar buildings from eighty to one hundred and twenty, and possibly to one hundred and fifty, feet in open spaces, details connected with the installation of modern electric passenger lift equipment merit closer study than they have hitherto received in this country. It is the intention, therefore, in this article to draw attention to the more important factors which affect the service and improve the rentable value of the higher floors by making them almost as accessible from the street, as regards time and convenience, as the lower floors.

Horizontal and Vertical Transport.

Modern electric passenger lift practice in large buildings will, if analysed, be seen to resemble, in miniature, a suburban surface railway, a tube railway, or a tramway serving from three to twelve or more stations or stopping places, the main differences being that the direction of travel is in a vertical instead of a horizontal direction, the stations or floors are nearer together, the service is, or should be, better (*i.e.*, the time interval between the departure of successive cars is shorter), and the number of passengers entering and leaving the cars at intermediate stations or floors is smaller.

If the number of cars is insufficient to carry the number of passengers who desire to travel, or the cars are large and carry a considerable number of passengers, but have in consequence to stop at each floor on the up trip, and at each floor on the down trip, it is obvious that in the first case a considerable number of people will ascend the stairs rather than wait if their destination is not far up; and, in the second case, that the service will be so bad that many people will be kept waiting for an unreasonable length of time, or will become impatient and will also walk up. In either case, it is obvious that there will be reasonable cause for complaints, and tenants on the higher floors will either seek accommodation elsewhere which is more conveniently situated, as regards time from the street, or demand lower rentals, due to the inconvenience. The limiting point in the carrying capacity of any passenger lift is reached when certain combinations of passengers carried and floors to and from which they are carried occur, and it is now proposed to examine these factors in detail.

Operating Cycle.

The daily or hourly work of an electric passenger lift consists of a definite cycle of operations many times repeated, the complete cycle being termed "a round trip." The number of trips per hour obviously depends on the time required for one trip, and this again depends on a number of factors.

The cycle of operations for a two-floor lift starting from rest at the ground floor may be roughly classified as follows:—

(*a*) Passengers enter the car at ground floor.
(*b*) Landing doors closed.
(*c*) Car gate closed.
(*d*) Car accelerates from rest to maximum load speed.
(*e*) Car runs at maximum load speed.
(*f*) Car approaches first stop and slows down from maximum load speed to rest at top floor.
(*g*) Car gate opened.
(*h*) Landing doors opened.
(*i*) Passengers leave car.
(*j*) Landing doors closed.
(*k*) Car gate closed.
(*l*) Car accelerates from rest to maximum load speed.
(*m*) Car travels at maximum load speed in downward direction.
(*n*) Car approaches ground floor and slows down from maximum load speed to rest at ground floor.
(*o*) Car gate opened.
(*p*) Landing door opened

Time for Round Trip and Trips per Hour.

Many people have apparently held the view hitherto that a high load speed meant quick service under all conditions, but consideration of the above-mentioned sixteen factors, constituting the cycle of operations, will indicate quite clearly that this is not necessarily the case. In fact, if the car is large and the stops very near together the operations of acceleration and retardation of speed will cover the distance travelled, and the car may seldom actually travel at maximum speed. Similarly, an indefinite increase in the passenger capacity of the car may in certain circumstances actually reduce the total number of passengers carried per hour.

Observations have been made in many hundreds of installations, and the following average figures have been obtained to enable time schedules to be calculated which will give reasonable accuracy in practice:—

(*a*) Time required to open and close landing doors. This depends upon the strength of the attendant, the accessibility of the door latch, ease of motion, and width of doors; average 1½ to 3 secs.

(*b*) Time required to open and close car gate. This also depends on factors as above, and averages 1½ to 3 secs.

(*c*) Time required for passengers to enter and leave the car depends upon age and experience of passengers, shape and size of car, number of people in car, &c. This averages 1½ to 6 secs., but is usually taken as 2 secs. for the combined operation.

(*d*) Time required for passengers to enter or leave car at intermediate landing, including doors and gates; usually taken as 6 secs.

(*e*) Landing stops are usually assumed to be 0.4 of the floors served in each direction. Thus, in a five-floor building there would be two stops on the up and two stops on the down journey, or $5+5=10$ and $10\times0.4=4$ stops.

(*f*) Mean speed is frequently assumed to be 80 per cent. of maximum speed, but, of course, this depends upon the value of the maximum speed and the distance apart of the stops. Thus, a car travelling from floor to roof at a speed of 10 ft. per sec. would, if the run were to be made up of a series of stops and starts 16 ft. apart, attain a mean speed of only about 6 ft per sec., *i.e.*, 60 per cent. of the maximum speed. The time required for acceleration and for retardation frequently averages from 3 to 6 secs., depending on the load speed.

EXAMPLE.—Assume a ten-floor building—*i.e.*, four passengers up and four down; maximum speed, 300 ft. per min.; height=120 ft. Then time required for round trip is:—

(*a*) Four passengers enter and four leave at the ground floor, at 2 secs. each	8 secs.
(*b*) Close and open landing doors at ground floor, at 2 secs. each	4 ,,
(*c*) Close and open car gate, &c...	4 ,,
(*d*) Eight landing stops, at 6 secs. (four on up and four on down journey)	48 ,,
(*e*) Travel time for 240 ft., at 80 per cent. of 300 ft.=	60 ,,
Total time	124 ,,

Trip time=2 mins. 4 secs., and trips per hour =29. Passengers handled per hour:—

Up	116
Down	116
Total	232

It will be observed that, if the basis of calculations is that shown above, when tenants arrive in the morning the car can call at 80 per cent of the floors on the upward journey and make a non-stop journey down without materially affecting the time schedule. Similarly, in the evening, the car will make a non-stop trip on the upward journey, and will call at 80 per cent. of the floors on the down trip. The round time trip of a lift should not exceed, as a general rule, 2½ mins., but will be found to vary between 1½ and 3 mins., depending on height of building, speed, &c.

Traffic Estimates and Number of Cars Required.

Lift traffic, unlike 'bus, tube, tramway and suburban railway traffic, cannot be almost indefinitely expanded to meet rush hours by adding additional cars, as it is only possible to run one car in one shaft, or between one set of guide rails; but, fortunately for lift engineers, abnormal rush traffic is not frequently encountered, and normal requirements which recur daily can be calculated with a fairly close degree of accuracy. The work of the lift is the carriage of passengers, and the passengers are either tenants or visitors. The number of visitors per hour is irregular, and they are less insistent upon immediate carriage than the tenants. Therefore, an estimate of probable tenancy provides in the majority of cases the means of ascertaining the maximum rate of travel which takes place at the time of their arrival and departure.

Generally speaking, the following figures will provide a very fair basis for calculating the maximum traffic to be handled in any given class of building:—

	Sq. ft. of Occupied Floor Area per Occupant.
Cinema theatres, from.. ..	6 sq. ft.
Cafés and restaurants, from..	12 ,,
Stockbrokers, engineers, &c., employing clerks, draughtsmen, &c.	100 ,,
Banks	120 ,,
Family hotel	200 ,,
Modern hotel	250 ,,
Flats	300 ,,

Frequently the occupied area of a modern office building will be found to average 60 per cent. of the gross area.

Other factors which will influence the hourly traffic of the lifts either in one or both directions are: Restaurant on one floor used by tenants; club or exclusive restaurant which the tenants' employees do not patronise; toilet rooms grouped on a single floor; basement and sub-basement floors which do not form part of the scheduled time-table; residential flats on upper floors, &c.

EXAMPLE.—Assume an office building of ten floors above the ground standing on a site 100 ft. by 50 ft.=5,000 sq. ft. per floor, or a total of 50,000 sq. ft. of floor space, and allow 100 sq. ft. per tenant, *i.e.*, 500 tenants. The majority will probably arrive and leave within a period of 30 mins., and the traffic to be handled is at the rate of 1,000 per hour. Assuming the lift referred to in the previous paragraph be installed as a unit, this will handle 232 per hour and, therefore, a minimum of four lifts are indicated, but preferably five should be installed to admit of one being laid off for repairs without seriously affecting the time schedule. If four lifts are installed, the time schedule (*i.e.*, the period of time between the dispatch of cars) will be 31 secs., and if five cars are installed the time schedule will be 25 secs. approximately, which would be considered quite satisfactory, as experience indicates that business people object to waiting more than 30 secs. Another factor which must be taken into account in deciding the number of lifts to be installed in high buildings, is that of extricating the occupants from the upper floors within

a reasonable space of time in the event of fire—a case which was well illustrated the other day in the Strand.

Size and Shape of Car.

In many existing buildings it is apparent that the size and shape of the car have been determined after practically every other constructional point was settled, and the efficiency of the lift service and the rental value of the upper floors has thereby been seriously impaired since the size and shape of the car are most important details in the time schedule. The narrow and deep car, the car with the narrow entrance and wide interior, and similar types need only be mentioned to enable their bad points to be at once appreciated, and to suggest immediately the wide, shallow car for practically all lift work. Except for tube railway work, straight through cars (*i.e.*, cars with two entrances opposite to each other) should be avoided, as this arrangement entails the attendant leaving his car switch and possibly forcing his way through a crowded car in order to reach and to open the opposite gate and doors at an upper landing. Self-closing and opening doors can be provided when the straight-through car is unavoidable, but the extra cost quoted recently was approximately £200 per lift on an installation quoted at £1,200.

The floor area of the car is determined by the required carrying capacity of the car, and in this connection it should be noted that with the single entrance each passenger must turn round once during the trip in order to face the landing.

An allowance of 2 sq. ft. per passenger and 4 sq. ft. for the attendant (to enable him to handle the controller, car gate, and landing doors rapidly) is the usual basis for figuring car capacity; for instance, a car having a floor area of 6 ft. by 5 ft. = 30 sq. ft. would have a passenger capacity of 30 less 4 = 26, which divided by 2 gives 13 passengers.

Similarly, the weight of the average individual has been ascertained to be 140 to 150 lbs., and, therefore, the assumed load is figured at 75 lbs. per sq. ft. of floor area.

Convenient car sizes are as follows :—

Depth.	Width.	Area.	Passengers.	Attendant.	Total.	Live Load.
6 ft.	7 ft.	42	19	1	20	3,150
5 ft.	6 ft.	30	13	1	14	2,250
4 ft. 4 i	6 ft.	26	11	1	12	1,950
4 ft.	5 ft.	20	8	1	9	1,500
3 ft.	4 ft.	12	4	1	5	900

In modern office buildings up to ten floors a very useful size for the car is 5 ft. wide by 4 ft. 4 in. deep (*i.e.*, 21.5 ft. super., carrying eight to nine passengers). Large departmental stores of the Oxford-street, Regent-street and Kensington type generally require a larger car, and in this case the size is frequently 8 ft. wide by 6 ft. deep, giving a floor area of 48 sq. ft., and designed for a maximum load of 3,600 lbs. With these exceptions a 6 ft. by 6 ft. car is generally regarded as the largest standard car, rated for sixteen passengers and a gross load of 2,700 lbs.

Shaft or Well.

The width and depth of the shaft or well depend on the relative positions occupied by the car guides and the counterweights with respect to the entrance or entrances, and also on the position of the engine and the type of guides used. One of the most convenient arrangements is that in which the counterweight is located at the back of the shaft or opposite the entrance, in which case the width of the car would be approximately 8 in. and the depth 9 in. less than the shaft, providing no wood backing is used for the guides and the engine is located at the top of the shaft.

A very inconvenient arrangement is the straight-through car with the counterweights at the side and wood backing to the car guides. In this case the width of the car will be approximately 17 in. and the depth 4 in. less than the shaft. This obviously makes a narrow, deep car, which has been shown to be undesirable.

When lifts are grouped in batteries of two or more, frequently one common shaft only is built, the inner car guides being carried on steel joists provided at each floor level, or at heights not exceeding 10 ft. If, when the shaft is constructed, 3 in. by 3 in. timbers are built into the wall at 6 ft. intervals for guide fixings, and special care is exercised to obtain dead vertical walls, considerable expense will be avoided later in cutting away and trimming up the guides. In a recent case, the walls were found to be 2½ in. out of the vertical in a 60 ft. shaft!

A clear space of not less than 3 ft. should be provided between the bottom of the shaft and the lowest point of the underside of the car floor when the car is standing at its lowest landing, and between the top of the cross-head of the car and the underside of the ceiling of the shaft when the car is at the top landing. For express lifts these overtravel spaces must be increased up to a maximum of 7 ft. for the highest speeds, and even for slow-speed alternating-current lifts 4 ft. is desirable.

Landing Doors.

Collapsible gates are not desirable for brick shafts on account of the added fire risk, due to flue effect, and also because of draughts. The type of door should be that best adapted to the particular type of car to be installed, and the width of the opening should be such that ingress and egress will be as free as possible—usually 66 per cent. of the width of the car, in order to provide standing space for the attendant. Adequate allowance should be made for floor projections into the shaft, which vary with the type of door adopted, viz., combination slide and swing single slide; double doors sliding in the same direction; double doors sliding in opposite directions; double swing doors, &c. Wired glass panels should be provided in all landing doors to avoid accidents when opened quickly. The standard height of landing doors is 7 ft., and the minimum width should be 2 ft. 6 in.

Winding Engines and Speeds.

Practically all modern winding engines are driven by electric motors. There are two principal types, viz., (*a*) drum; (*b*) traction or Vee-sheave.

In the drum type of machine the two lifting ropes to the car wind on to one side of the drum as the two ropes to the counterweight wind off the other. There are several disadvantages, the chief of which are: Should the car stick on the down trip, the drum would continue to unwind the ropes; risk of overwinding; excessive width of drum in high buildings; restriction of number of ropes to two, which means large diameter ropes, drums and leading sheaves for heavy cars; and lateral traverse of the ropes on the drum. Safety devices are, of course, introduced, but since prevention is better than cure, the traction or Vee-sheave engine has been introduced.

The geared traction or Vee-sheave machine consists of a driving sheave or pulley having four or more grooves over which the ropes pass direct from the car to the counterweight. The ropes, which are not attached to the sheave at all, are not allowed to bed on the bottom of the grooves, but are driven by the wedge action of deeply-cut "V" shape grooves, so long as there is sufficient weight on both ends of the ropes to keep them firmly in contact with the grooves. To prevent any risk of overwinding, it is only necessary to arrange for the counterweight to descend on to buffers when the car is 6 in. above the top landing, and in the event of the car sticking on the down trip the weight is removed from one end of the ropes and the Vee-sheave is free to rotate.

There are several forms of traction or Vee-sheave engines, notably the single-worm gear (chiefly used in this country); tandem or double worm gear; herringbone-spur gear; and for very high speed the gearless, *i.e.*, the Vee-sheave is directly keyed to the shaft of a slow-speed motor. The main objection to all types of traction or Vee engines is the risk of ropes slipping on the sheave, and especially is this the case if an excessive amount of oil is used and quick stops are attempted on the down trip with a full car on a high-speed lift. This difficulty has now been overcome to a large extent by the use of the crossover drive, in which an idler is fixed below the driving sheave. The ropes, therefore, pass twice over the driving sheave and once over the idler, and if required the idler can be set off so that it acts also as a deflector for the counterweight ropes, leading them vertically over the centre of the counterweights. As the face of the Vee-sheaves are of one standard width, this machine is suitable for buildings of any height.

As a very rough guide, the following figures are given for speeds :—

Travel of Car.	Load Speed.
30 to 40 ft.	150 to 200 ft. per min.
45 to 70 ft.	180 to 250 ft. per min.
75 to 100 ft.	222 to 300 ft. per min.
100 ft. and over.	300 to 400 ft. per min.

Due allowance must, of course, be made for car size, distance of average non-stop run, &c. In New York City, 500 ft. per min. is the legal limit of speed for local elevators and 700 ft. per minute for expresses, *i.e.*, when there is a clear non-stop run of 80 ft.

Location of Engine and Dimensions of Gear and Engine Rooms.

Both drum and Vee-sheave machines can be located either in the basement, on any of the intermediate floors, or directly over the shaft. There is a good deal to be said for the basement location, as they are then under closer supervision than when inspection involves a journey to the roof. Certainly when the electrical energy is supplied on the alternating-current system careful consideration should be given to the basement proposition, as the danger of noise from the motors and brakes is then materially lessened.

Considered purely from the point of view of the ropes and first cost, the most desirable position for a Vee-sheave or traction machine, driven by a direct-current motor, is over the shaft, and more are placed in this position than in any other.

One of the principal factors in the successful operation of lift equipment is the provision of ample accommodation for the overhead sheaves and for the engines.

The usual height of the car from the floor to the top of the cross-head is 10ft., and allowing the overtravel space or head room of 3 ft., this indicates that the minimum height to the underside of the floor of the engine or gear room from the top landing is 13 ft. The thickness of the floor depends upon the weight to be carried, but will not be less than 6 in. When the engine is in the basement, 4 ft. is probably sufficient, but 6 ft. is desirable for the guide sheaves at the top of the shaft. Eight feet clear height should be regarded as the minimum for the engine room, whether it be situated in the basement or at the top of the shaft, and 9 ft. 6 in. is desirable for the larger machines. Wherever possible a steel joist and lifting tackle should be installed in the engine room to facilitate repairs when two or more lifts are provided.

When the engine is at the top of the shaft, the rear wall of the engine house can usually be carried up flush with the rear wall of the shaft, but space about equal to the depth of the shaft (*i.e.*, back to front) should be provided in front to accommodate the engine. The weight on the engine room floor when the engine is located at the top of the shaft is, for a speed of 50 ft. per min., approximately as follows, exclusive of the controller and cables :—

Car Capacity. *Passengers.*	Dead Load. *Tons.*
6	2.6
9	3.4
12	4.6
15	5.5
18	6.5

Higher speeds involve larger engines and motors, and weights will be proportionately increased. It should be noted that the weights given above are for dead loads, and, in figuring constructional details for strength, at least 50 per cent. should be added to calculations to provide for the live load effect of the car and counterweights.

Control.

There are three principal types of control, viz. :—(*a*) Hand rope, (*b*) car switch, (*c*) push-button.

Hand rope is seldom or never used in modern passenger lift work, and is, in any case, only suitable for very slow-speed lifts, chiefly employed on the transport of goods. Car switch is undoubtedly the best type of control for the type of lift contemplated in this article, and lends itself admirably to two and three speed work, when the lift is constantly in charge of an attendant. The handle should be of the self-centering or "dead man" type, *i.e.*, it should return automatically to the centre or "stop" position immediately it is released. It should also be removable so that should the attendant leave the car he can take the handle with him, and thus prevent unauthorised persons operating it.

Push-button control is the most expensive of the three types, but is very popular for certain classes of work, as the attendant can be dispensed with and greater accuracy is obtained in stopping at floor levels. In residential flats, dual control is not infrequently provided and arranged in such a manner that during the hours the attendant is on duty a two- or three-speed car-switch control is used, but when he leaves the control is switched over to single-speed push-button, which the tenants can handle with ease and safety.

Counterweights.

A regard for reasonable economy in operation requires that the moving parts of a lift shall be so balanced as to leave the least practicable amount of dead weight to be lifted. Usually the empty car is overbalanced to the extent of 40 per cent. of the maximum passenger capacity of the car, which has been shown to be the average load if the equipment is well designed. Careful balancing not only has a marked effect on the consumption of electrical energy but also on the speed of an empty descending car and proper upward stopping distance.

On lifts in high buildings the variation in the length of the ropes supporting the car and the counterweights, when the car is at different heights in the shaft, introduces an additional complication in counterweighting, but this is usually surmounted by attaching chains to the car and counterweight. By this means, when the car is near the top of the shaft, and hence the supporting ropes are short, the maximum length of chain is suspended from the car. Conversely, when the car is low and the counterweight is high up in the shaft the greater length of the chain is suspended from the counterweight.

Conclusion.

In the very limited space available it has only been possible to touch upon the main points of lift equipment as they affect the general design and lay-out of the building, but possibly these details may prove of use to architects in the early stages of a project in the absence of more detailed information on the subject.

Proposed Bank Extension at Bristol.

The Estates Committee of the Bristol Council has reported in favour of an arrangement to let to Lloyds Bank property in Small-street and Small-street-court, to be pulled down to form a site for an extension of the Bank. The terms arranged are that the Bank shall hold the site for 75 years at an annual rental of £850, and shall pull down the existing property and erect new buildings on the site at a cost of not less than £25,000.

THE OUTLOOK IN THE BUILDING INDUSTRY.

On pp. 9, 10 and 11 are some contributions on the problems which confront the building industry in the near future from presidents of several architectural societies allied to the R.I.B.A., and below we give communications showing the points of view of builders and operatives. A contribution from Mr. S. Stranks, Organising Secretary of the Amalgamated Union of Building Trade Workers, is given on p. 54.

FROM MR. SAMUEL SMETHURST
(*Ex-President, Institute of Builders*).

Things are very uncertain in regard to the prosperity of the building trade until we get a real revival in the industries which have large exports. Outside of this consideration I think things are very hopeful for the future. The dislocation of the normality of things which was the heritage of the war, aggravated by the foolish and false teaching of some sections of the people called Socialist, which has prolonged and added to the evil consequences of the war by persuading men in all nations to believe that it was possible to consume more although they were producing very much less, is passing, and men of all classes are beginning to see things in their true perspective. With the return of complete sanity in this respect all over the world we shall soon everywhere regain prosperity, and the future of building will be very bright. Whether the coming year will witness the effect of this change is doubtful. I believe rather that it will be a year of keen competition for the work that is going, with the consequent sharpening of our wits and development of the energy we lost during the period of war conditions, which will be good training for the good time coming, although producing little profit.

FROM THE OPERATIVE'S POINT OF VIEW.

FROM MR. GEORGE HICKS
(*President, National Federation of Building Trade Operatives*).

Arrears in building repair work were never in greater proportion than now. New houses are in as great a demand at the present time as at any period within living memory. Yet over 150,000 building trade operatives are unemployed. What a paradox! What a social puzzle, and problem!

The above represents the harsh facts presented to the building industry for 1922. Employers and operatives will meet at periods when the economic interests of each side bump too vigorously against each other and attempt accommodation, but the larger problem, the problem of meeting the social need, will, I fear, not be seriously tackled.

During the past year a good many difficult hurdles were successfully negotiated, and I think it speaks volumes for the building trade as a whole that practically the whole of its reorganised and readjusted economic basis, and the tremendous changes that have taken place, many established factors being transformed almost out of recognition because of the change from a local to an area and then to a national basis, was carried out around the conference table.

To return to the arrears of work crying out for attention, and the unemployed operative—who or what is responsible for keeping these apart? None can deny the existence of both. Recently I have had occasion to visit many of our towns up and down the country, and the general dilapidated appearance of houses business and dwelling) cannot escape notice. The joinery, painting, brickwork, plumbing, slating, &c., that require doing as a matter of real urgency, both from the points of view of safety and economy, could absorb the whole of our men. The only houses in several of our large industrial centres which appear to have received attention are the "pubs," most of which have been painted and generally renovated.

When the question is asked, who is responsible for preventing the full expression of this demand, the public says the builders and operatives are in collusion, the employer says the operative should work longer hours, and the operative says the employer is only just using him for the time being, and very shortly he, the operative, will be amongst the unemployed or on the human scrap heap. All the above generally find common ground in stating that high prices paid for materials controlled by the combines and builders' merchants are very largely responsible. Each side is generally able to make out a very good case from its particular point of view; certain it is that building costs, just as costs in other industries, are compelled to adapt and adjust themselves and follow the economic law.

Confidence is a great factor in any association; I mean confidence that there is going to be a fair and square deal, and that sharp practices will not be resorted to. Confidence is one of the greatest assets in all walks of life. During the year 1921 the building operative had held over his head the threat of dilution practically the whole year. Some employers as well as operatives understood quite well how heavy, cumbersome and un-economic such a proposal was, yet well-balanced opinion was rejected—as it usually is—in favour of the dramatic, although we as operatives felt the whole thing was bound to fail, as it has. Yet this thing had a most disturbing effect. Just as this "stunt" has been placed in the background, by the ordinary application of what one might call "horse sense," now the master builders have resurrected suspicion by a threatened attack on the present working week. The operative does not profess to be so well or so minutely acquainted with economic abstractions, but he has a little grasp of economic arithmetic, and to tell him that if, with 150,000 of his mates unemployed, he worked a few hours longer than he already does, it would help to put his mates into work—well, he would ask the speaker to get mentally examined! In addition, the operative believes in, and rightly claims, greater possibilities of recreation than was his lot prior to 1914.

Industrial maintenance is the next consideration that must be given to the operative. Such issues as 'ca'canny,' dilution, demarkation, &c., would all automatically solve themselves if full industrial maintenance were established. The employers—in the main—already have it. The next step is that the operatives must have it.

"Restriction of effort is largely conditioned by the fear of unemployment, and some ways and means must be found to meet that elementary human need—the chance to live. With guarantees against poverty the need for artificial limitation in any sphere disappears. There could then be set up, encouraged, and developed a healthy form of national apprenticeship in all skilled branches of the trade. If the industry were made attractive for the boy, a splendid supply of "lively" labour would be created to tackle the arrears and assist in meeting the ever-growing need.

Whilst it would be impossible in the space of an article to deal with the hundred-and-one things the industry will have to deal with, I have given the operative's point of view on some of the most prominent things. At the same time, I feel sure if the same breadth of conception of the operative's right for a fuller life obtains in the coming year as it did in the last, 1922 should see the industry elevated to yet a higher plane, and the community's needs more effectively catered for and met.

Proposed Unemployment Relief Works at Northampton.

The following schemes are being considered by the Northampton Town Council in order to provide work for the unemployed:—Kingsthorpe (*a*) Lake scheme, estimated cost £175,870; (*b*) park, estimated cost £19,230; (*c*) new road, estimated cost £18,620; (*d*) river diversion, estimated cost £33,547. Cliftonville road widening, estimated cost £3,917. Land-road path, estimated cost £3,325. Dallington Park lay-out, estimated cost £7,660. Far Cotton Recreation Ground, estimated cost £12,000.

IS DISRUPTION BETWEEN BUILDERS AND OPERATIVES JUSTIFIABLE?

BY S. STRANKS.

(Organiser, Amalgamated Union of Building Trade Workers.)

I GLADLY avail myself of the opportunity of ventilating through the columns of *The Builder* the views of building operatives on the present situation in the building industry. I more readily do this because, owing to the absence of direct contact with the workmen, many of your readers are apt to assimilate views which are the outcome of bias and particular interests. Further, in common with many others interested in the trade-union movement, I am becoming alarmed at the reckless manner displayed by the extreme elements among the employers, which, if persisted in, will, without a doubt, engender a spirit among those wedded to constitutional action which will cut right across reasonable and ordered progress. Society generally is resigned to the fact that organisations of employers and employed will exist, and many are conscious of the fundamental differences which exist between their members. Up to the present the majority of people fail to see any other method of adjusting those differences except through such organisations, and as these grow in number and power it is quite in the order of things that evidence of abuse in the exercise of such power will be displayed; there is grave danger that in industrial activities abuse of power will increase unless those elements which prefer reason to prevail combat the irresponsible individuals who exist in both ranks.

The economic chaos due to the late war, and accentuated through a senseless treaty, is having its effect on the building industry. I see and hear all kinds of reasons given through the Press and by builders as to the cause of the collapse of commerce generally; it has been quite a common practice to cast most of the blame on the trade unions, and it has been a marvel to me the docile way this has been accepted. It has been a convenient smoke-screen for those directly responsible.

In the building operatives' ranks there is a feeling that the federated builders are definitely out to try conclusions on the issue of the 44-hour week, and it is known that I personally have scouted such intentions; my opinion on this was founded on what we have been promised, and the belief that all the facts are in support of the continuation of the 44 hours, and bearing in mind the efforts made on both sides to try to stabilise the conditions in the industry, I cannot for one moment believe the federated employers will force a fight (as fight it must be if they attempt to impose a lengthening of hours of labour) which will upset all and throw the industry into a continual whirlpool of conflict for a considerable time.

As to the promises made, all are aware that when the war was on the workers were told by those in authority, from the Prime Minister downward, that as a result of their sacrifice their material welfare was to be uplifted. No one at that time questioned those promises, but soon after the war it was a common practice for employers to ridicule the expectations aroused. I have it impressed on my mind that during conferences in the building trade the employers repeatedly held out expectations of better things for building operatives, and it is the latter who now begin to wonder if all these promises were not made with the object of deceiving. It would not be correct to say improvements have not been effected in working conditions of the operative, but these are nothing in proportion to the increase of wealth in the country, and judged by the demoralising standard of the workmen prior to the war the improvements are scarcely worth mentioning.

With the object of cheapening cost of building operations and stabilising conditions so as to assist in the revival of the building industry, the operatives agreed to a drastic reduction of wages and a system which governs their wages according to the cost of living. Is there any other party in the country—builders or builders' merchants—that has responded so generously? Already the signs are clear that on the score of wages the promises of better times are falsified. The 44-hour week is the only improvement brought about which is worthy of respect, yet we are informed this must go! But on this matter the builders will find, in view of the concessions made by the workmen, that much will happen if any attempt is made to rob them of this improvement. The claim for a 44-hour working week was based on some of the finest sentiments obtaining in the ranks of labour. Broadly, it stated that the worker is a natural being desirous of sharing in the store of literature, art, science, and recreative pursuits, and also those social and domestic ties which, owing to long working hours, were denied him. We claim that in return for the valuable service rendered to the community the working classes have a right to the best; further, the human race must benefit in the long run by extending to the worker more opportunities for self-culture. This sentiment is up against those who look upon him as a mere profit-making machine, but I feel sure that among architects, builders and others there are those who appreciate the need for meeting these desires on the part of the thinking workmen. Again, we claim on economic grounds that a reduction of hours of labour is absolutely essential—the only way under our present social system of alleviating unemployment is to spread out the work among more people, and a reduction of hours would tend in this direction.

But the builder states that his objection to a 44-hour week is on the score of output. I am surprised at the confusion here (or is it an attempt to confuse?). Is there a practical builder who can prove that the cost of building will be cheapened by increasing hours of labour? Will it be contended that, if instead of working eight hours the operative works nine hours, the builder's client gets a cheaper building? Quite the reverse. Is it not in accord with the physical powers of the average man that the cost of the ninth hour, if he works it, will prove more costly than the preceding hours in consequence of lower output? It may be pointed out that in some cases output has been known to diminish on shorter hours, but this may be due to other factors; on the other hand, we have evidence from Home Office Factory Inspectors and enlightened employers of labour which proves positively that reduction of hours produces a higher standard of efficiency. Really on this matter of production in relation to hours I am amazed at anyone attempting to prove that longer hours mean cheapening production. With the exception of one section of the building industry there is no dearth of labour. I suggest that instead of advocating more hours to meet any prospective demand for labour the proper course is to promote by every possible means a popular system of apprenticeship. Some of us entertained hopes that the employers were inclined to this, but at the last meeting of the Joint Industrial Council they were in evidence in trying to eliminate provisions in the apprenticeship scheme which were of importance.

On the question of output, here again we find the federated employers are busy trying to put the operative in the dock. That output is not what it used to be some of us are agreed, and, what is more, hope it never will return to the pre-war standard. Those of us who were employed in those days have a vivid recollection of the intensified life during working hours. The conditions were such that one envied the savage races; it did not take long to reduce a workman to a standard minus any respect for the craft he followed, which involved scamping the work, and undue physical powers being exerted to an unbearable point. This state was largely due to scarcity of employment. The builder is well aware that output varies according to the state of trade; the workman is more dependent if trade is bad, hence intensified competition and high output. The reverse produces less output. The same factor operates with the builder, *i.e.*, when trade is bad profits are lower, and when trade is good profits are higher. We are all amenable to the same law—there is no meaning to the law of supply and demand if these phases are not displayed. Again, it is a well-known fact that war conditions demoralised both employer and employed; while one was out for profiteering the other took part in the scramble, and we are suffering from the effects.

The question of output will never be solved under present conditions; so long as we are wedded to economic tenets which leave the individual to the operation of the law of supply and demand it is useless to complain of effects. What incentive is there to any workman to do his best when he is conscious of his insecurity? In fact, this insecurity produces an outlook of fear and foreboding. What a state of mind to be in, condemning a man to be ever fearing discharge, with its consequent evil of poverty! The miner is pressed to increase output; he does so, and suffers unemployment. Boot-makers are pressed to do likewise, and suffer unemployment. The same results obtain in most trades. This is the difficulty of the men in the building trade and all arguments fail to convince the worker differently.

When the whole relations between the workmen and the community have been revolutionised, then we may look for improvement. The sociology of the workman is developing to a higher status. He demands a more elevated position in the industry which he is a part of, and he begins to conceive himself as something more than a mere accommodation for profit. We may have to wait some time before this tendency is clarified, and in the meantime, I suppose, trade unions will have to be content continually to meet the Simon Pure attitude of employers on the crimes of their members in regard to output. In this connection it is interesting to note that prominent builders, while always condemning workmen for low output, are seeking to apologise for builders' merchants' high prices due to rings.

But to return to the issue raised by employers on the 44-hour week. I sincerely hope no attempt will be made to upset this. It reflects no credit in such a short time for the employers to want to destroy it, and it cannot be said to have had a fair trial. The benefit of the 44-hour week, socially and domestically, is too much appreciated by the intelligent workman for him to relinquish it without a severe struggle. To say there are no workmen who desire more hours would be untrue. Some people would pay no taxes or rates without certain power to compel them, and so long as it is in the interest of the community it is justifiable to use power. In the same sense we believe the regulation of conditions in an industry is in the interest of all—some of the things done by the employers' federation, for instance, do not meet with the approval of every member. I have thirty-three years' membership of my union and thirty years of that time have been spent in active work for it, and in the whole of my experience I have never seen such unanimity among the officials and the active rank and file of the building union in regard to any issue as in regard to that of the 44-hour week. If the issue is forced to a fight I am convinced moderates and extremists will stand solid together, determined to see it through. What some of us are concerned about is that in the event of the extremists in the employers' ranks forcing a dispute, then without a doubt constitutionalism will recede, and we shall witness a continued conflict which will test the existence of all that has been done along the lines of constitutional effort. Many officials courted unpopularity during the boom period of the building trade in persuading their members to conform to constitutional methods. With that return to good trade which is expected, is there anyone who would expect this section to repeat its policy if matters were pushed along the lines which rumour indicates?

REGULATIONS FOR WOODWORKING MACHINERY.

AFTER consideration of the objections raised by employers to the draft Regulations under Section 79 of the Factory and Workshop Act, 1901, for the use of woodworking machinery, which were issued on the recommendation of the Joint Industrial Council for the Building Trade on September 3, 1920, the Secretary of State announces that he is prepared to make considerable modifications in the Regulations, as shown in the revised draft and memorandum given below. The Secretary of State thinks the Regulations as revised should go far to meet all the difficulties raised, and hopes they will now be accepted, and that the necessity for a formal inquiry will be avoided. Objections to the draft Regulations must be sent to the Secretary of State within 21 days from January 3, 1922.

The Revised Regulations are as follows:—

DEFINITIONS.

"Woodworking machine" means a circular saw, plain band saw, planing machine, vertical spindle moulding machine or chain mortising machine operating on wood.

"Circular saw" means a circular saw working in a bench (including a rack bench) for the purpose of ripping, deep-cutting or cross-cutting, but does not include a swing saw or other saw which is moved towards the wood.

"Plain band saw" means a band saw, other than a log saw, the cutting portion of which runs in a vertical direction.

"Planing machine" includes a machine for overhand planing or for thicknessing or for both operations.

"Within reach" means within 6½ ft. from the floor or from any other point to which any person has access while the machinery is in motion.

"Underground room" means a room any part of which is so situate that half or more than half the whole height thereof measured from the floor to the ceiling is below the surface of the footway of the adjoining street or of the ground adjoining or nearest to the room.

"Gauge" means the British Standard Wire Gauge.

DUTIES.

It shall be the duty of the occupier to observe Part I of these Regulations.

It shall be the duty of all persons employed to observe Part II of these Regulations.

PART I.—DUTIES OF OCCUPIERS.

(1) Every woodworking machine shall be provided with an efficient stopping and starting appliance, and the control of this appliance shall be in such a position as to be readily and conveniently operated by the person in charge of the machine.

(2) Every shaft, wheel, pulley, strap, band or other device within reach by which any part of a woodworking machine receives its motion shall be securely fenced.

(3) Sufficient clear and unobstructed space shall be maintained at every woodworking machine while in motion to enable the work to be carried on without unnecessary risk.

(4) The floor surrounding every woodworking machine shall be maintained in good and level condition, and as far as practicable free from chips or other loose material, and shall not be allowed to become slippery.

(5) Where the natural light at a woodworking machine is inadequate and can be improved by the provision of additional or better windows, or by whitening the walls or tops of the factory or by altering the position of the said machine, or by any other reasonable means, the occupier shall within a reasonable time take such steps as the Inspector may, by written notice, direct to improve the natural light at the said machine.

(6) The means of artificial lighting for every woodworking machine shall be adequate, and shall be so placed or shaded as to prevent direct rays of light from impinging on the eyes of the operator.

(7) After January 1, 1923, no woodworking machine shall be worked in any underground room unless the room is certified by an Inspector of Factories to be suitable for the purpose as regards construction, light, ventilation, and in all other respects.

(8) The temperature of any part of a room in which a woodworking machine is being worked shall not at any time fall below 50 deg., except where and in so far as the construction of the room and the necessities of the business carried on make it impracticable to maintain this temperature; but in that case the workers shall be protected as far as practicable from draughts by screens or other suitable means.

(9) (*a*) Every person while being trained to work a woodworking machine shall be fully and carefully instructed as to the dangers arising in connection with such machine and the precautions to be observed.

(*b*) No person shall be employed at a woodworking machine unless he has been fully trained to work that class of machine or unless he works under the constant supervision of a person who has a thorough knowledge of the working of the machine.

(10) Where a circular saw or planing machine is in frequent use and causes an appreciable amount of dust, adequate steps shall, if so directed by the Inspector, be taken by the provision of an efficient exhaust arrangement or otherwise to prevent the escape of any appreciable amount of the dust into the air of the room or place in which the saw or machine is working.

(11) Every circular saw shall be fenced as follows:—

(*a*) The part of the saw below the bench table shall be protected by two metal plates, one on each side of the saw; such plates shall not be more than 6 in. apart, and shall extend from the axis of the saw outwards to a distance of not less than 2 in. beyond the teeth of the saw, and shall, if not beaded, be of a thickness at least equal to 14 gauge, or, if beaded, be of a thickness at least equal to 20 gauge.

(*b*) Behind and in a direct line with the saw there shall be a riving knife, which shall have a smooth surface, shall be strong, rigid, and easily adjustable, and shall also conform to the following conditions:—(i) The edge of the knife nearer the saw shall form an arc of a circle having a radius not exceeding the radius of the largest saw used on the bench. (ii) The knife shall be maintained as close as practicable to the saw, having regard to the nature of the work being done at the time, and at the level of the bench table the distance between the front edge of the knife and teeth of the saw shall not exceed ½ in. (iii) For a saw of a diameter of less than 24 in. the knife shall extend upwards from the bench table to within 1 in. of the top of the saw, and for a saw of a diameter of 24 in. or over shall extend upwards from the bench table to a height of at least 9 in. (iv) Except at the edge nearer the saw, the thickness of the knife shall be at least equal to the breadth of the cut of the saw.

(*c*) The top of the saw shall be covered by a strong and easily adjustable guard, with a side flange at the front of the saw. The guard shall be kept so adjusted that the flange of the guard on the front side of the bench shall extend below the roots of the teeth of the saw. The guard shall extend from the top of the riving knife to a point as low as practicable at the front of the saw.

(12) A suitable push-stick shall be kept available for use at the bench of every circular saw which is fed by hand, to enable the work to be carried on without unnecessary risk.

(13) Every plain-band saw shall be guarded as follows:—(*a*) Both sides of the bottom pulley shall be completely encased by sheet metal or other suitable material. (*b*) The front of the top pulley shall be covered with sheet metal or other suitable material. (*c*) All portions of the blade shall be enclosed or otherwise securely guarded, except the portion of the blade between the bench table and the top guide.

(14) After January 1, 1923, no planing machine, which is not mechanically fed, shall be used for overhand planing unless it is fitted with a cylindrical cutter block.

(15) No planing machine, which is not mechanically fed, shall be used for planing overhand any piece of wood less than 12 in. in length unless a safe holder is used for such piece of wood. Provided that this Regulation shall not apply to the operation of planing the edges of flat pieces of wood.

(16) Every planing machine used for overhand planing shall be provided with a "bridge" guard capable of covering the full length and breadth of the cutting slot in the bench, and so constructed as to be easily adjusted both in a vertical and horizontal direction.

(17) The feed roller of every planing machine used for thicknessing, except the combined machine for overhand planing and thicknessing, shall be provided with an efficient guard.

(18) The cutter of every vertical spindle moulding machine shall when practicable be provided with the most efficient guard having regard to the nature of the work which is being performed.

(19) For such work as cannot be performed with an efficient guard for the cutter, the wood being moulded at a vertical spindle moulding machine, shall, if practicable, be held in a jig or holder of such construction as to reduce as far as possible the risk of accident to the worker.

(20) A suitable "spike" or push-stick shall be kept available for use at the bench of every vertical spindle moulding machine.

(21) The chain of every chain mortising machine shall be provided with a guard which shall enclose the cutters as far as practicable.

(22) The guards and other appliances required by these Regulations shall be maintained in an efficient state, and shall be constantly kept in position while the machinery is in motion, except when, owing to the nature of the work being done, the use of the guards or appliances is rendered impracticable. The guards shall be so adjusted as to enable the work to be carried on without unnecessary risk.

(23) Regulations 11, 13, 16 and 17 shall not apply to any woodworking machine in respect of which it can be shown that other safeguards are provided and maintained which render the machine equally safe as it would be if guarded in the manner prescribed by these Regulations.

PART II.—DUTIES OF PERSONS EMPLOYED.

(24) Every person employed on a woodworking machine shall (i) use and maintain in proper adjustment the guards provided in accordance with these Regulations; (ii) use the "spikes" or push-sticks and holders provided in compliance with Regulations 12, 15, 19 and 20; except when, owing to the nature of the work being done, the use of the guards or appliances is rendered impracticable.

New Year Honours.

One of the new Baronets, Sir John Jarvis, is Chairman of J. Jarvis & Sons, Ltd., the well-known firm of building and engineering contractors. He was managing director of the firm from 1906 to 1919. Sir John has had wide experience in engineering and constructional problems in different parts of the world, and under his direction many important contracts have been carried out by his firm, including churches in Australia, Grimsby, Little Coates, Harrogate, Southend, and elsewhere. He built the Sark Lighthouse for Trinity House, the Radium Institute, the Lancashire Electric Power Co.'s Manchester works, and the Dublin United Tramway Co.'s chimneys. Sir John was associated with the late Wm. Willet in endeavouring to settle the building strike in 1914.

NEW BUILDINGS IN LONDON.

WEST.—New premises are in course of erection in Woodstock-street, Bond-street, W., for Mr. Cyril Sykes, F.A.I., which will be known as "The Blenheim Auction Galleries." The buildings comprise extensive ground and first floor galleries for the purpose of auction sales to be held weekly. The premises will be completed early this year, when sales will be recommenced. The architect is Mr. T. S. Darbyshire, A.R.I.B.A., M.S.A., of 43, Great Marlborough-street, W. The general contractors are Messrs. Perry & Perry, of 14, Old Cavendish-street, W., and the constructional steelwork is being carried out by Messrs. Smith Walker, of Tothill-street, Westminster, S.W.

ACTON.—Work has just commenced on the first of a number of concrete bungalows to be erected on an open site in Noel-road. The present programme will complete the scheme commenced some months ago for the Acton Borough Council under the supervision of the Ministry of Health. It is understood that forty-six detached and semi-detached bungalows will be built. They will be in mass concrete, with 8 in. external walls with a stone finish. Each bungalow will contain three bedrooms, living-room, kitchen, and usual offices. The living-rooms will be lined with imitation oak panelling. "Inter-oven" stoves will supply hot water to the kitchen sink, bath-room; gas coppers and gas cookers will be installed in the sculleries. Well-fires will be fitted to two of the bedrooms. Steel casement frames, side and top hung, will be supplied by Messrs. Crittall, of Braintree, Essex. Doors of Californian timber will be supplied by the W.O.C.O. Door Co. A method of moulding the mass concrete walls, known as the "Metaform" system of interlocking steel forms, is being employed.

PONDERS END.—The Guild of Builders (London), Ltd., has now made a commencement with the contract referred to in our issue for December 2. An extensive site has been secured on the east side of Southbury-road, covering some fifteen to sixteen acres. It is proposed to erect twenty-five pairs of brick-built houses, comprising three groups, each varying slightly in character and construction. The largest group will consist of sixteen pairs of parlour type houses with bay windows and the external walls finished in roughcast. Each house in this group will have a parlour, living-room, scullery, three bedrooms, and a bathroom. The second group is to consist of seven pairs of houses, also of the parlour type, but having a larger living room, parlour and three bedrooms, kitchen and usual offices, bath room, and cycle shed. The remaining two pairs will be of the non-parlour type, with living-room, scullery and larder combined, coal house and bathroom on the ground floor, and three bedrooms.

WAGES ON PUBLIC WORKS

THE Public Works Conciliation Board has agreed that for the three months January, February, and March, 1922, the following rates of wages shall apply for operatives engaged on public works in the City and Metropolitan Police Area of London: Labourer, 1s. 5½d. per hour; blacksmith, 1s. 10d.; concrete leveller, 1s. 5½d.; duct or earthenware drain layer, 1s. 6½d.; fitter, 1s. 10d.; granite mason (kerb, &c.), 1s. 11d.; granite sett dresser, 1s. 10d.; jointer, 1s. 6½d.; kerb fixer, 1s. 10d.; pavior, 1s. 10d.; platelayer, 1s. 6½d. to 1s. 7½d.; platelayer labourer, 1s. 5½d.; pneumatic pick operator, 1s. 6½d.; rammerman, 1s. 6½d.; scaffolder, 1s. 8½d.; screeder, 1s. 6½d.; steam-roller driver, 1s. 9½d.; street mason and flag dresser, 1s. 10d.; tarpot man, 1s. 5½d.; timberman, 1s. 6½d.; wood-block layer, 1s. 6½d.; watchman, 8s. 6d. minimum day or night. Men working in "boots" 1d. per hour extra. Workmen working in dirty or dangerous places subject to special rates and conditions. Boys 14 to 16 years, one-third of labourer's rate; boys 16 to 18 years, one-half of labourer's rate; boys 18 to 20 years, two-thirds of labourer's rate. The hours of labour and overtime rates remain as agreed on March 11, 1920.

RATES OF WAGES IN THE BUILDING TRADE.

The following are the rates of wages in the building trade in England and Wales. Every endeavour is made to ensure accuracy, but we cannot be responsible for errors that may occur:—

	Masons.	Bricklayers.	Carpenters, Joiners.	Plasterers.	Slaters.	Plumbers.	Painters.	Masons' Bricklayers' Plasterers' Labourers.
Aberdare	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Accrington	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/-	1/7½
Altrincham	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Ashton-under-Lyne	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Barnsley	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Barrow-in-Furness	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Barry	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Bath	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/5
Bedford	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/4
Birkenhead	2/2	2/2	2/2	2/2	2/2	2/2	2/2	1/9½
Birmingham	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Bishop Auckland	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Blackburn	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Blackpool	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Bolton	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Bournemouth	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/4
Bradford	2/-½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Bridgwater	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/3
Brighton	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/4
Bristol	2/0½	2/0½	2/0½	2/0½	2/0½	2/-	2/0½	1/7½
Burnley	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Burton-on-Trent	1/11	1/11	1/11	1/11	1/11	1/11	1/11	1/8
Bury	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Cambridge	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/4
Cardiff	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Chatham	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/3½
Chelmsford	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/4
Cheltenham	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/5
Chester	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Chesterfield	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Colchester	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/4
Coventry	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Crewe	1/11	1/11	1/11	1/11	1/11	1/11	1/11	1/6
Darlington	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Derby	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Doncaster	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Dudley	1/11	1/11	1/11	1/11	1/11	1/11	1/11	1/6
Durham	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
East Glam. and Mon. Valleys	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Exeter	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/7½	1/4
Folkestone	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/3½
Gloucester	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/8½	1/5
Grantham	1/11	1/11	1/11	1/11	1/11	1/11	1/11	1/6
Grays	2/0½	2/0½	2/0½	2/0½	2/0½	2/1	1/11½	1/7½
Grimsby	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Great Yarmouth	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/3½
Guildford	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/4
Halifax	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Harrogate	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Hartlepools	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Hastings	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/3½
Hereford	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/8½	1/5
Huddersfield	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Hull	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Ipswich	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/4
Lancaster	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Leamington Spa	1/11	1/11	1/11	1/11	1/11	1/11	1/11	1/6
Leeds	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Leicester	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Lichfield	1/11	1/11	1/11	1/11	1/11	1/11	1/11	1/6
Lincoln	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Liverpool	2/2	2/2	2/2	2/2	2/2	2/2	2/2	1/9½
Llanelly	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
London	2/0½	2/0½	2/0½	2/0½	2/0½	2/1	1/11½	1/7½
Loughborough	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Luton	1/8½	1/8½	1/-½	1/8½	1/8½	1/8½	1/8½	1/4
Maidstone	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/3½
Manchester	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Mansfield	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Merthyr Tydfil	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Middlesbrough	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Newcastle-on-Tyne	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Newport, Mon.	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Northampton	1/11	1/11	1/11	1/11	1/11	1/11	1/11	1/6
Norwich	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/4
Nottingham	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Oakham	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/5
Oldham	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Oxford	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/4
Plymouth	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	1/9½	1/6
Pontypridd	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Portsmouth	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/4
Preston	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Reading	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/4
Rochdale	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Rochester	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/3½
Rugby	1/11	1/11	1/11	1/11	1/11	1/11	1/11	1/6
St. Albans	1/-½	1/-½	1/8½	1/8½	1/8½	1/8½	1/8½	1/4
St. Helen's	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Scarborough	1/11	1/11	1/11	1/11	1/11	1/11	1/11	1/6
Sheffield	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Shrewsbury	1/11	1/11	1/11	1/11	1/11	1/11	1/11	1/6
Southampton	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/4
Southend-on-Sea	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/4
Southport	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
South Shields	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Stockport	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Stockton-on-Tees	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Stoke-on-Trent	2/-	2/-	2/-	2/-	2/-	1/11	2/-	1/7
Stroud	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8	1/4
Sunderland	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Swansea	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Taunton	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/4
Torquay	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/4
Tunbridge Wells	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/4
Wakefield	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Walsall	1/11	1/11	1/11	1/11	1/11	1/11	1/11	1/6
Warrington	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
West Bromwich	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Wigan	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Windsor	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/4
Wolverhampton	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½
Worcester	1/11	1/11	1/11	1/11	1/11	1/11	1/11	1/6
York	1/11	1/11	1/11	1/11	1/11	1/11	1/11	1/6

(For rates of wages in the Building Trade in Scotland, see page 57.)

CONTRACTS, COMPETITIONS, &c.

For some contracts still open, but not included in this List, see previous issues. Those with an asterisk are advertised in this number. Certain conditions beyond those given in the following information are imposed in some cases, such as that advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the name of those willing to submit tenders, may be sent in; the name and address at the end is the person from whom or place where quantities, forms of tender, &c., may be obtained.

BUILDING AND PAINTING.

JANUARY 7.—**Eltham.**— HOUSES.— Contract D: Erection of 54 houses; Contract E: 44 houses, for the Council of the Metropolitan Borough of Woolwich on their Housing Estate at Eltham. Messrs. Young & Brown, quantity surveyors, Gwydyr Chambers, 104, High Holborn, W.C.1. Deposit, £2 2s.

JANUARY 9.—**Chichester.**—PIPES.—Supply of 2,400 yds. of 9 in. diameter cast-iron pipes and 150 yds. of 12 in. diameter cast-iron pipes, to the T.C. Mr. Frank J. Dobley, City Engineer, East-street, Chichester.

JANUARY 9.—**Clayton Heights.**—REPAIRS.—Repairs (Slaters, Joiners, Plumbers) to be done at Clayton Heights Council School, for the Queensbury and Clayton District Sub-Committee. Mr. B. Leah, Education Office, Bingley.

JANUARY 9.—**Darlington.**—HOUSES.—Laying-out an estate at Darlington, including roads, drainage, and the erection of 200 houses, for the North Eastern Railway Housing Trust. Mr. Arthur Pollard, Architect, North-Eastern Railway, York.

JANUARY 9.—**East Ham, E.6.**—SEWERS.—Construction of about 1,265 lineal yards of 15 in. dia. stoneware pipe sewers, together with manholes and appurtenant work in connection therewith, for the C.B. The Borough Engineer, Town Hall, East Ham, E.6. Deposit £1 1s.

JANUARY 9.—**Margate.**—LAVATORIES.—Erection of ladies' and gents.' lavatories on the foreshore of Cliftonville, for the T.C. Borough Engineer, 13, Grosvenor-place, Margate.

JANUARY 9.—**Pantog.**—VARIOUS WORKS.—(1) Widening and reconstruction of Coedygric Canal Bridge; (2) Rebuilding wall in Coedygric-road; (3) Construction of River bridge between Griffithstown and New Inn, for the U.D.C. Mr. T. P. Holmes Watkins, Clerk, Pontypool.

JANUARY 9.—**Snodland.**—FIRE STATION.—Erection of fire station for the Parish Council. Mr. T. Fidler, Clerk, Pelham House, Snodland, Kent.

JANUARY 9.—**Warrington.**—SUB-STATION.—Erection of a new sub-station in West-avenue, Stockton Heath, for the T.C. Mr. W. T. Davenport. Quantity Surveyor, Queen's Chambers, Sankey-street, Warrington. Deposit, £1 1s.

JANUARY 10.—**Cannock.**—TRANSFORMER STATION.—Erection of a transformer station in Queen-street, for the U.D.C. Mr. S. Harrison, Architect, Council Offices, Cannock. Deposit £2.

JANUARY 10.—**Grantham.**—HOUSES.—Erection of 12 houses, for the T.C. Mr. F. O. Donaldson, Borough Architect, Guildhall, Grantham.

JANUARY 10.—**Malden.**—BUILDERS' WORK.—Builders' work in connection with installation of pumping machinery for the U.D.C. Mr. R. H. Jeffes, Surveyor, Municipal Offices, New Malden. Deposit £2 2s.

JANUARY 10.—**Mynyddislwyn.**— HOUSES.— Erection of 130 houses at Mynyddislwyn (Bryn Site) for the Commissioners of H.M. Office of Works. Contracts Branch, King Charles-street, London, S.W.1. Deposit £1 1s.

JANUARY 11.—**Edmonton.**—REPAIRS.—For repairs to Brookfield House, Fore-street, for the U.D.C. Mr. Cuthbert Brown, Engineer, Town Hall, Edmonton.

JANUARY 11.—**Loughborough.**—ALTERATIONS.—Additions and alterations to buildings at the Gas Works, for the T.C. Mr. Edward Onions, Gas Engineer, Loughborough. Deposit £1 1s.

JANUARY 11.—**Manchester.**—WASHHOUSE.—Erection of a public washhouse adjoining Gorton Baths, for the T.C. City Architect, Town Hall, Manchester. Deposit, £1 1s.

JANUARY 11.—**Morley.**—CONVERSION.—For converting room at Free Library into clinic, for the Education Committee. Mr. F. Turner, Borough Engineer, Town Hall, Morley.

JANUARY 11.—**Nottingham.**—ALTERATIONS.—Alterations at (a) Radford Police Station (Ilkeston-road) and (b) at Bulwell Police Station, for the T.C. City Architect, Guildhall, Nottingham. Deposit £1, each contract.

JANUARY 11.—**Nottingham.**—PAINTING.—For painting the North Wilford Generating Station, for the T.C. Mr. T. Wallis Gordon, Acting City Engineer, Guildhall, Nottingham. Deposit £1.

JANUARY 12.—**Fishguard.**—ALTERATIONS.—Alterations at the Wireless Station, Fishguard, for the Commissioners of His Majesty's Office of Works. Contracts Branch, King Charles-street, London, S.W.1. Deposit one guinea.

JANUARY 12.—**Manchester.**—BUILDINGS.—Erection of a calorimeter house, works offices and an ambulance room at the Bradford-road Gasworks, for the T.C. Mr. G. W. Kaye, Secretary, Gas Department, Town Hall, Manchester. Deposit £1 1s.

JANUARY 12.—**Peterborough.**—ALTERATIONS.—Supply of electrical plant and provision of foundation, and structural alterations to existing buildings. Mr. H. A. Nevill, City Electrical Engineer, Peterborough.

JANUARY 12.—**Plymouth.**—BRIDGE, &C.—Erection of a small bridge, approach roads, and other works at Marsh Mills, for the T.C. Mr. T. Peirson Frank, Borough Engineer, Municipal Offices, Plymouth.

JANUARY 12.—**West Ham.**—HOUSES.—Erection of 28 houses in Cumberland-road, Plaistow, E., for the B.C. Borough Engineer, Town Hall, West Ham, E.15. Deposit £2.

JANUARY 13.—**Glamorganshire.**—VARIOUS WORKS.—(1) Cottage and set of farm buildings at Radyr; (2) set of farm buildings at Drope, Michaelston (about one mile from St. Fagan's); (3) two cottages and three sets of farm buildings at Prisk (about 1¼ miles from Cowbridge); (4) cottage at West House, Llanmaes; (5) cottage and set of farm buildings and repairs and adaptation to existing cottage known as "Broadway Cottage," at St. Mary Hill (about three miles from Pencoed), for the Glamorganshire C.C. Sir T. Mansel Franklen, Clerk, Glamorgan County Hall, Cardiff.

JANUARY 13.—**Leicester.**—ALTERATIONS.—Alterations at the Employment Exchange, Leicester, for H.M. Commissioners of Works. Contracts Branch, H.M. Office of Works, King Charles-street, London, S.W.1. Deposit £1 1s.

JANUARY 13.—**London.**—PAINTING.—Execution of painting work, at Mount Pleasant Postal Depot, London. Contracts' Branch, H.M. Office of Works, King Charles-street, London, S.W.1. Deposit £1 1s.

JANUARY 13.—**Lydney and Leicester.**—ALTERATIONS.—Alterations at (1) Lydney Post Office, (2) Leicester Employment Exchange, for the Commissioners of His Majesty's Office of Works, Contracts Branch, King Charles-street, London, S.W.1. Deposit £1 1s.

JANUARY 13.—**Portsmouth.**—BUILDING.—Erection of compressing station building at Langstone Harbour, for the T.C. Mr. G. Midgley Taylor, engineer, 36, Victoria-street, Westminster, S.W. Deposit £2.

JANUARY 13.—**West Cornforth.**—SCHOOL.—Erection of Infants' Council School at West Cornforth, for the Durham C.C. Mr. F. Willey, architect, 34, Old Elvet, Durham.

*JANUARY 14.—**Belgium.**—CEMETERY CONSTRUCTION.—Fifth Programme of Construction, consisting of approximately 14 cemeteries in Belgium, for the Imperial War Graves Commission. Contract 1921E, Secretary (Works Dept.), Imperial War Graves Commission, 82, Baker-street, London, W.1.

JANUARY 14.—**Bridlington.**—COTTAGES.—Erection of four cottages and buildings on Wilsthorpe Estate, Carnsley, near Bridlington, for the East Riding C.C. County Land Agent, County Hall, Beverley.

JANUARY 14.—**Harrogate.**—BOILER HOUSE.—Building boiler house, at the Gas Works, Ripon-road, for the Harrogate Gas Co. Mr. Frank H. Robinson, Engineer, Gas Office, James-street, Harrogate.

JANUARY 16.—**Cardiff.**—PAVILION.—Competitive designs and tenders for the supply and erection of a concert pavilion in Llandaff Fields, for the T.C. Mr. E. J. Elford, City Engineer, Cardiff. Deposit £2 2s.

JANUARY 16.—**Ramsgate.**—ADAPTATION.—For partial adaptation of Chatham House for use by County School for Boys, for the Kent E.C. Mr. W. H. Robinson, Architect, Sessions House, Maidstone. Deposit £2.

*JANUARY 17.—**Cardiff.**—FINISHINGS CONCRETE HOUSES.—Finishings of 24 semi-detached concrete houses at Ely, for the Cardiff City Council. Mr. E. J. Elford, City Architect, City Hall, Cardiff. Deposit 2 guineas.

JANUARY 17.—**Southampton.**—BRIDGES.—Reconstruction of Wickham (South) and Kitnocks Bridges, for the C.C. Mr. W. J. Taylor, County Surveyor, The Castle, Winchester. Deposit £2 2s.

JANUARY 18.—**France and Belgium.**—HEADSTONES.—The Imperial War Graves Commission invite tenders for a total supply of 6,500 headstones. Secretary, Works Dept., Imperial War Graves Commission, 82, Baker-street, London, W.1.

JANUARY 18.—**Fulham.**—EXTENSION.—For extension of the Generating Station at Townmead-road, for the Metropolitan Borough of Fulham. The Town Clerk, Town Hall, Fulham, S.W.6. Deposit £10.

JANUARY 18.—**Grimsby.**—HOUSES.—Erection of 50 houses, for the T.C. Mr. J. W. Jackson, Town Clerk Municipal Buildings, Grimsby. Deposit £2.

JANUARY 19.—**Beeston.**—HOUSES.—Erection of 14 non-parlour (7 pairs) and 2 parlour (1 pair) houses, for the U.D.C. Surveyor, Public Offices Beeston, Nottingham. Deposit £2 2s.

JANUARY 20.—**Middlesex.**—HOUSES.—Erection of (1) 46 houses, &c., at Yiewsley, Middlesex; (2) roads and sewers in connection therewith, for the Commissioners of His Majesty's Office of Works. Contracts Branch, King Charles-street, London, S.W.1. Deposit £1 1s.

*JANUARY 23.—**Barking Town.**—HOUSES.—Erection of 40 (or alternatively 80) houses of various types on the Greatfields Estate, Ripple-road, Barking, for the U.D.C. Mr. C. J. Dawson, Council's Architect, Clock House Chambers, Barking. Deposit £2.

JANUARY 24.—**Bridgwater.**—SHOW BUILDINGS.—Erection of showyard buildings, &c., for show to be held at Bridgwater in May, 1922, for the Somerset County Agricultural Association. Mr. Harold O. Samson, 1, Hammet-street, Taunton.

*JANUARY 24.—**Gloucester.**—BUILDING.—Erection of a Telephone Exchange at Gloucester, for the Commissioners of His Majesty's Office of Works. Contracts Branch, King Charles-street, London, S.W.1. Deposit £1 1s.

JANUARY 25.—**Bristol.**—OFFICES.—Construction of new administrative offices at the Avonmouth Docks, for the Docks Committee. Mr. Thomas A. Peace, Engineer's Office, Avonmouth Docks. Deposit, £3.

JANUARY 25.—**Wandsworth, S.W.18.**—HOUSES.—(a) Erection of 82 non-parlour houses on the Watney Estate, Southfield, in groups comprising respectively 24, 28, and 30 houses; (b) 68 non-parlour houses on the Furzedown Estate, Tooting, in groups comprising respectively 14 and 54 houses. Watney Estate: Mr G. L. Elkington, Norfolk House, 7, Laurence Pountney-hill, Cannon-street, E.C.4; Furzedown Estate: Mr. H. B. Elkington, Norfolk House, 7, Laurence Pountney-hill, Cannon-street, E.C.4. Deposit £2 2s. in respect of each estate.

JANUARY 26.—**Castleford.**—SCHOOL.—Erection of technical and evening schools at Castleford, for the West Riding E.C. Education Architect, County Hall, Wakefield.

*JANUARY 28.—**Abertillery.**—HOUSES.—Erection of 24 houses on the Rose Heyworth housing site, for the Urban District Council. Council's Engineer and Surveyor, at the Council Offices, Abertillery. Deposit £2 2s.

JANUARY 31.—**Gretna.**—REPAIRS.—For repairs at the parish church and manse. Mr. R. Tweedie, architect, 43, Lady-street, Annan.

FEBRUARY 1.—**Gosport.**—REBUILDING.—Rebuilding of the "Rose and Crown" public house, Hardway for the Portsmouth United Breweries, Ltd. Mr. Walmesley, architect, 7, King's-terrace, Southsea.

*NO DATE.—**Aylesbury.**—HOUSES.—Erection and completion of 20 houses for the Borough. Messrs. Murrell & Pigott, Architects, 35, Bedford-row, W.C.1. Deposit £2 2s.

NO DATE.—**Manchester.**—STORES.—Erection of general stores for Messrs. Henry's, 95 to 101, Market-street, Manchester. Mr. Charles Swain, architect, 12, Exchange-street, Manchester.

NO DATE.—**Salford.**—GARAGE, &C.—Erection of a motor garage and repair shed at Wilburn-street Depot, for the T.C. Superintendent, Cleansing Department, Wilburn-street, Salford.

FURNITURE, MATERIALS, etc.

JANUARY 7.—**Dorchester.**—MATERIALS.—Supply to the Dorset C.C. of granite, limestone, basalt, tarmacadam, steam rolling, tarspraying, and tar. Mr. W. T. Fletcher, County Surveyor, County Offices, Dorchester.

BUILDING TRADE WAGES IN SCOTLAND.*

THE following are the present rates of wages in the building trade in the principal towns of Scotland. Every endeavour is made to ensure accuracy, but we cannot be responsible for errors that may occur:—

	Masons.	Bricklayers.	Carpenters, Joiners.	Plasterers.	Slaters.	Plumbers.	Painters.	Masons' Bricklayers' Labourers.	Plasterers'
Aberdeen	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	1/11	1/5½ to 1/6½	
Airdrie	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	—	1/7½	
Alexandria	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	—	1/7½	
Arbroath	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½	1/6½	
Ayr	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/1	1/6½	
Bathgate	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/5½	1/5½ to 1/6½	
Blairgowrie	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½	—	—	
Bo'ness	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/-	1/6	
Coatbridge	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	—	1/7½	
Dumbarton	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/9	1/7½	
Dumfries	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½	1/7½	1/6 to 1/7	
Dundee	2/0½	2/0½	2/0½	2/0½	2/0½	2/4	1/9	1/7½	
Dunfermline	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	—	1/7½	
Duns	1/9	1/9	1/9	1/9	1/9	1/9	1/6	1/5 to 1/4	
Edinburgh	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	—	1/7½	
Falkirk	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	—	1/7½	
Fort William	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½	—	1/5	
Galashiels	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½	—	—	
Glasgow	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/1	1/7½	
Greenock	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/1	1/4½ to 1/7½	
Hamilton	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/1	1/7½	
Hawick	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	2/-	1/4½	
Helensburgh	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	—	1/7½	
Inverness	1/11½	—	1/11	1/11	1/11½	1/11	1/11	1/0 to 1/3†	
Kilmarnock	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/1	1/7	
Kirkcaldy	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	—	1/6½	
Kirkwall	1/9	1/9	1/9	1/9	1/9	1/9	—	1/2	
Lanark	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	—	1/7	
Motherwell	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	—	1/7½	
Perth	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/1	1/7½	
Stirling	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	1/7½	
Stirlingshire (Eastern District)	2/0½	2/0½	2/0½	2/0½	2/0½	2/4	2/1	1/7½	
Wishaw	2/0½	2/0½	2/0½	2/0½	2/0½	2/0½	—	1/7½	

* The information given in this table is copyright. The rates of wages in the various towns in England and Wales are given on page 58.

† Under unemployment relief scheme, 11d.

JANUARY 9.—**Liverpool.**—MATERIALS.—Supply to the Liverpool Overhead Railway Co. of stores for six months. Mr. E. J. Neachell, General Manager, 31 James-street, Liverpool.

JANUARY 9.—**St. Pancras.**—MATERIALS.—Supply of road and other materials to the B.C. Mr. E. W. Swinstead, Borough Engineer, Town Hall, Pancras-road, N.W.

JANUARY 9.—**Warrington.**—CEMENT.—Supply of 100 tons of Portland cement to the T.C. Mr. A. M. Ker, Borough Engineer, Warrington.

JANUARY 9.—**West Ham.**—TIMBER.—Supply of timber for use in handicraft centres, for the E.C. Mr. G. E. Hilleary, Town Clerk, The Grove, Stratford, E.

JANUARY 10.—**Easthampstead.**—MATERIALS.—Supply of road materials to the R.D.C. Mr. J. R. Treadwell, Surveyor, Council Offices, Bracknell.

JANUARY 10.—**Ryde.**—PIPES.—Supply of 1,500 yds. of 15 in., 12 in. and 9 in. stoneware sewer pipes and specials. Borough Engineer and Surveyor, Tower Hall, Ryde, I.W.

JANUARY 11.—**Warrington.**—STORES.—Supply to the Cheshire Lines Committee for five months or 11 months of stores and materials. Stores Superintendent, Cheshire Lines, Warrington.

JANUARY 13.—**Hastings.**—ROAD MATERIAL.—Supply of 1,000 yards of unbroken blue stone to the R.D.C. Mr. S. Bumstead, Clerk, 11, Wellington-square, Hastings.

JANUARY 14.—**Egypt.**—PAINTS, &C.—Supply of oils, paints, and varnishes to the Director of Stores. Frontier Districts Administration, Alexandria. Department of Overseas Trade, 35, Old Queen-street, S.W.

JANUARY 14.—**Winchester.**—TAR.—Supply of tar for use on roads for one year, to the Southampton C.C. Mr. W. J. Taylor, County Surveyor, The Castle, Winchester.

JANUARY 16.—**London.**—FURNITURE.—Supply to the Metropolitan Asylums Board of furniture (cabinet work, bentwood and other chairs), for two sanatoria. Office of the Board, Embankment, London, E.C.4.

*JANUARY 17.—**Bootle.**—KERBS, CHANNELS, CONCRETE FLAGS.—Supply of materials—(*a*) Kerbs—granite, grit stone, concrete, or other approved; (*b*) channels; (*c*) concrete flags, for the County B.C. of Bootle. Borough Engineer, Town Hall, Bootle.

JANUARY 18.—**Egypt.**—TIMBER.—Supply of timber to the Director of Stores, Frontier Districts Administration, Alexandria. Department of Overseas Trade, 35, Old Queen-street, S.W.

*JANUARY 18.—**France and Belgium.**—HEADSTONES.—For the total supply of 6,500 headstones, packed and delivered f.o.b., to be divided into a number of contracts, none of which shall be for less than 100 headstones. The Secretary, Works Department, Imperial War Graves Commission, 82, Baker-street, London, W.1.

JANUARY 19.—**Guildford.**—DESKS.—Supply of twelve desks for the Corn Exchange, for the T.C. Borough Surveyor, Tuns Gate, Guildford.

JANUARY 20.—**Wandsworth.**—MATERIALS.—Supply of disinfectants, granite (broken), &c., to the B.C. Mr. D. A. Nicholl, Town Clerk, Council House, Wandsworth, S.W. 18.

JANUARY 23.—**Madras.**—STONEWARE PIPES.—Supply of 55 miles of stoneware pipes and specials varying from 4 in. to 18 in. Messrs. J. Mansergh & Sons, agents for the Madras Corporation, 5, Victoria-street, Westminster, S.W.

JANUARY 24.—**London, S.W. 1.**—LAVATORY FITTINGS.—(1) Supply of pedestal closets; (2) urinals; (3) lavatory basins and sinks; (4) water waste preventor cisterns; (5) w.c. seats. Contracts Branch, H M. Office of Works, London, S.W. 1.

JANUARY 25.—**Johannesburg.**—CREOSOTE.—Supply of 45 tons of creosote in steel drums to the Manchester Council. Department of Overseas Trade, 35, Old Queen-street, S.W.

JANUARY 28.—**Chelmsford.**—MATERIALS.—Supply of road materials to the Highways Committee of the Essex C.C. Mr. Percy J. Sheldon, surveyor, Old Court, Chelmsford.

JANUARY 28.—**Egypt.**—MATERIALS.—Supply to the Director of Public Health, Cairo, of hardware, oils and paints, &c. Department of Overseas Trade, 35, Old Queen-street, S.W.

JANUARY 29.—**Peterborough.**—ROAD MATERIALS.—Supply of granite, tarmacadam, slag, &c., to the Stoke of Peterborough C.C. Mr. H. Russell, County Surveyor, 45, Priestgate, Peterborough.

JANUARY 30.—**Hatfield.**—ROAD MATERIALS.—Supply to the Herts C.C. of broken granite, slag, and tar macadam. Mr. A. E. Prescott, County Surveyor, Hatfield.

ENGINEERING, IRON AND STEEL.

JANUARY 9.—**London.**—PUMP, &C.—Centrifugal pumps and oil or gas engines, for a pumping station to be erected at Hammersmith, for the L.C.C. Chief Engineer, County Hall, Spring-gardens, Charing Cross, S.W. Deposit £5.

JANUARY 10.—**Cowdenbeath.**—FENCING.—Supply and erection of (1) wrought iron railings and gates; (2) stob and wire fencing, on housing site, for the T.C. Mr. C. A. Alexander, Burgh Surveyor, Town House, Cowdenbeath. Deposit £1 1s. each contract.

JANUARY 10.—**Edinburgh.**—MATERIAL FOR SIDINGS.—Permanent way materials for sidings at Portobello Electricity Station, for the T.C. Sir Alexander Kennedy, engineer, 17, Victoria-street, Westminster, S.W.1.

JANUARY 10.—**London.**—STEEL TUBES.—Supply to the Metropolitan Water Board of 112 feet of 48 in. dia. socket and spigot lap-welded steel tube in 16 ft. and 8 ft. lengths. Offices of the Board (Room 150), New River Head, 173, Rosebery-avenue, E.C.1.

JANUARY 10.—**Maldens and Coombe.**—PUMPING MACHINERY, &C.—(1) Supply and erection of two centrifugal pumps. (2) supply and erection of two 10 B.H.P. horizontal electric motors, starting gear, &c., or the electric lighting in the station; (3) comprising builders' work and forming new entrance. Mr. R. H. Jeffes, Surveyor, Municipal Offices, New Malden. Deposit £2 2s. each contract.

JANUARY 10.—**Maldens and Coombe.**—VEHICLE, &C.—(1) Supply of one 2½ ton electric lorry with tipping body, (2) supply and erection of a mercury vapour rectifier outfit, for the U.D.C. Mr. R. H. Jeffes, Surveyor, Municipal Offices, New Malden. Deposit £2 2s. and £1 1s. respectively.

*JANUARY 10.—**New Zealand.**—GATES, &C.—Supply to the Auckland Harbour Board of mild steel or iron gates and fencing for Quay-street frontage, Auckland. Messrs. W. & A. McArthur, Ltd., Canberra House, 18-19, Silk-street, London, E.C. Deposit £50.

JANUARY 11.—**Braintree.**—PIPES.—Supply of 14 tons of cast-iron pipes, 4 in. diameter, to the U.D.C. Mr. W. Orieur, Clerk, Braintree.

JANUARY 11.—**Nottingham.**—HOT WATER SYSTEM, &C.—(a) Extension of hot-water system (Institution), (b) provision of stay rods for roof of balcony (Infirmary), for the Board of Guardians. Mr. J. Allan Battersby, Clerk, Poor Law Offices, Shakespeare-street, Nottingham.

JANUARY 11.—**Rhondda.**—BRIDGES.—Construction and delivery of various bridges, having an aggregate weight of steelwork of about 130 tons, for the U.D.C. Mr. E. Taylor, Surveyor, Council Offices, Pentre, Rhondda.

JANUARY 11.—**Rhondda.**—PIPES.—Supply to the U.D.C. of about 300 tons of 6 in., 9 in. and 12 in. cast-iron pipes. Mr. E. Taylor, Surveyor, Council Offices, Pentre, Rhondda.

JANUARY 12.—**London.**—ELECTRIC LIFT.—Provision and erection of an electric passenger lift, capable of dealing with a load of 11¼ cwt., at Geoffrey House, Tabard Garden Estate, Bermondsey. Chief Engineer, Gloucester House, 19, Charing Cross, W.C. Deposit £1.

JANUARY 12.—**Manchester.**—CONCRETE HOPPERS.—Construction of two reinforced concrete hoppers, 60 and 24 tons capacity, at their Bradford-road Gasworks, for the T.C. Mr. G. W. Kaye, Secretary, Gas Department, Town Hall, Manchester. Deposit £1 1s.

JANUARY 13.—**Belgium.**—DOCK.—Construction of a dry dock at Langerbrugge, near Ghent. Dept. of Overseas Trade, 35, Old Queen-street, S.W.

JANUARY 14.—**Manchester.**—ENGINE AND WEIGHBRIDGE.—(a) Saddle-tank, 4-wheeled coupled steam locomotive, 3 ft. gauge, (b) 20-ton weighbridge. Secretary, Rivers Department, Town Hall, Manchester.

JANUARY 16.—**Belgium.**—CANAL.—Construction of new channel from the Scheldt to the Docks at Antwerp. Department of Overseas Trade, 35, Old Queen-street, S.W.

JANUARY 16.—**Eccles.**—SALVAGE PLANT.—Supply and erection of a tins and waste metal scrap baling plant, for the T.C. Mr. G. W. Willis, Sewage Disposal Works, Peel Green-road, Patricroft.

JANUARY 17.—**London.**—RAILWAY STORES.—Supply to the Great Indian Peninsula Railway Co. of spare parts of carriages, copper plates, bolts, nuts, canvases, &c. Mr. E. H. Walpole, Secretary, 48, Copthall-avenue, E.C.

JANUARY 17.—**Wallasey.**—GAS PLANT.—Supply of purifiers at Gasworks. Mr. J. H. Crowther, Gasworks, Limekiln-lane, Wallasey.

JANUARY 18.—**London.**—WATER PLANT.—Supply to the Metropolitan Water Board of Lancashire boilers, superheater, piping and feed pumps at Deptford, S.E.8. Mr. Henry E. Stilgoe, Chief Engineer, 173, Rosebery-avenue, E.C.1. Deposit £1 1s.

JANUARY 19.—**Edinburgh.**—ELECTRIC INSTALLATION.—Electric lighting installation of the Public Wash-house, Causewayside, for the T.C. Mr. Frank A. Newington, Engineer, Electricity Supply Offices, Dewar-place, Edinburgh. Deposit, £1 1s.

JANUARY 20.—**London.**—RAILWAY MATERIALS.—Supply to the Bombay, Baroda and Central India Railway Co. of boilers, files, picks, grinding wheels, &c. Mr. S. G. Young, Secretary, White Mansion, 91, Petty France, S.W. Charge, £1 for boiler specification and 10s. each for others.

JANUARY 20.—**New Romney.**—IRON RAILINGS.—Erection of about 280 yards of iron railings at the Burial Ground, New Romney, for the T.C. Mr. W. Lamacraft, Town Clerk, Town Hall, New Romney, Kent.

JANUARY 22.—**Southend-on-Sea.**—RETORTS.—Supply of retorts, firebricks, &c., to the Gas Department of the T.C. Mr. M. E. Bradford, Manager, Gas Works, Southend-on-Sea.

JANUARY 28.—**Newport (Salop).**—WATERWORKS.—Erection of engine-house and pumping plant, &c., at Lilleshall Water Works, for the R.D.C. Messrs. Berrington, Son & Wathey, engineers, Prudential Chambers, Wolverhampton. Deposit £2 2s.

JANUARY 30.—**Sunderland.**—CONCRETE TANK.—Construction of a mass concrete gasholder tank, 127 ft. 6 in. dia. by 25 ft. 8 in. deep, for the Sunderland Gas Co. Mr. C. D. Drury, engineer, Hendon Gas Works, Sunderland. Deposit £2 2s.

*FEBRUARY 1.—**London.**—METERS.—Supply to the Metropolitan Water Board of the up-stream and throat sections, pressure piping, float pipes, apparati, recorders, &c., for three Venturi meters. Mr. Henry E. Stilgoe, Chief Engineer, 173, Rosebery-avenue, Clerkenwell, E.C.1.

FEBRUARY 1.—**Siam.**—RAILWAY MATERIAL.—Supply to the Siam State Railways of 500 pairs wheels and axles. Messrs. C. P. Sandberg, 40, Grosvenor-gardens, London, S.W. 1. Charge £1.

FEBRUARY 6.—**Camberwell.**—TELEPHONES.—For maintenance of private telephones and electric bells at public buildings of the B.C. Borough Engineer, Town Hall, Camberwell.

FEBRUARY 9.—**Manchester.**—AQUEDUCT.—Laying and jointing of 54-inch welded steel and other pipes, the fixing of valves and ironwork, the construction of subways under railways, &c., connected with the fourth pipe line from Thirlmere to Manchester, as follows: (*a*) Ambleside to South of Kendal (about 8½ miles); (*b*) Kirkby Lonsdale to Lancaster (about 8½ miles); (*c*) South of Lancaster to River Ribble (about 4½ miles). (*d*) River Ribble to Horwich (about 6½ miles). Secretary, Waterworks Offices, Town Hall, Manchester. Deposit, £5 5s. each contract.

FEBRUARY 10.—**Johannesburg.**—WATER METERS.—Supply to the T.C. of 1,200 ¾ in. meters. Dept. of Overseas Trade, 35, Old Queen-street, S.W.

FEBRUARY 15.—**Australia.**—TELEGRAPH MATERIAL.—Supply of telegraph apparatus and parts to the Commonwealth of Australia. Supply Officer, Australia House, Strand, London, W.C. 2.

FEBRUARY 15.—**Bulgaria.**—GRAIN ELEVATOR, &C.—Construction at the port of Varne of a concrete grain elevator (capacity, 30,000 tons) and drying shed. Department of Overseas Trade, 35, Old Queen-street S.W.

FEBRUARY 21.—**Argentine.**—PLANT.—Supply to the Argentine Ministry of Public Works of steam cranes, concrete mixers, tip wagons, machine tools, steam hammer, excavator, &c. Department of Overseas Trade, 35, Old Queen-street, S.W.

FEBRUARY 26.—**Belgium.**—PORT.—Construction of fishing port at Ostend. Department of Overseas Trade, 35, Old Queen-street, S.W.

ROAD, SANITARY, AND WATER WORKS.

JANUARY 6.—**Litherland.**—SEWER.—Constructing a stoneware pipe sewer at Hawthorne-road, for the U.D.C. Mr. Geo. Ponsford, Surveyor, Council Offices, Litherland.

JANUARY 7.—**Eyemouth.**—ROADS.—Roads, drains, sewers, and water mains, in connection with 12 houses, for the T.C. Messrs. Charles Mitchell & Telfer, architects, 2, Randolph-crescent, Edinburgh. Deposit £1 1s.

JANUARY 7.—**Llantrisant.**—SEWERS.—Construction of sewers in connection with Pontyclun housing scheme, for the R.D.C. Messrs. Thomas & Morgan & Partners, architects, Pontypridd. Deposit £1 1s.

JANUARY 7.—**Oswestry.**—WATER MAINS.—Laying 1,977 yards of 4 in. and 235 yards of 3 in. cast-iron water mains in the Parish of St. Martins; supply of 4 in. and 3 in. water mains, in 9 ft. and 12 ft. lengths. Messrs. Berrington, Son & Watney, 4, Memorial Hall, Oswestry. Deposit £2 2s.

JANUARY 7.—**Tadcaster.**—WATER MAINS.—Extension to water mains at Micklefield and Ledston Luck, for the R.D.C. Mr. E. Thackray, Water Inspector, Station-road, Kippax.

JANUARY 9.—**Ainwick.**—SEWER.—Extension of sewer at South Craster, for the R.D.C. Mr. H. Grey, South Craster.

JANUARY 9.—**East Ham.**—SEWERS.—Construction of 1,265 lineal yards of 15 in. stoneware pipe sewers, for the B.C. Borough Engineer, Town Hall, East Ham. Deposit £1 1s.

JANUARY 9.—**Romsey.**—ROADS.—For making up 3,000 super yards of road, for the T.C. Borough Surveyor, Town Hall, Romsey.

JANUARY 9.—**Wallsend.**—ROADS, &C.—Construction of roads and sewers in connection with housing scheme. Borough Surveyor, Town Hall, Wallsend.

JANUARY 9.—**West Riding of Yorkshire.**—VARIOUS WORKS.—(1) Repairs to Bramham Bridge, including concrete invert, &c.; (2) reconstruction of Shepherd's Hill culvert; (3) reconstruction of culvert at Coniston Moor, for the West Riding Highways Committee. Mr. H. R. Hepworth, West Riding Surveyor, County Hall, Wakefield. Deposit £1 1s. each contract.

JANUARY 13.—**Glasgow.**—PLAYING PITCHES.—Formation of certain playing pitches at Kelvinside, for the E.A. Messrs. Crouch & Hogg, engineers, 31, Lynedoch-street, Glasgow. Deposit, £1 1s.

JANUARY 14.—**Headington.**—WATER SUPPLY.—For carrying out water scheme at Garsington, for the R.D.C. Mr. A. Walker, Surveyor, Hill Crest, Windmill-road, Headington.

JANUARY 16.—**Eastbourne.**—SEWER.—For laying about 470 yards of pipe sewer, and 576 yards of concrete tubes for surface water sewer, for the T.C. Compton Estate Office, Eastbourne. Deposit £2 2s.

JANUARY 16.—**Plymouth.**—STREET WORKS.—Street cleaning and watering and collection of trade refuse in various districts, for the T.C. Mr. T. Peirson Frank, Borough Engineer, Borough Engineer's Office, Plymouth.

JANUARY 17.—**Musselburgh.**—SEWERAGE WORKS.—Construction of new outfall and intercepting pipe sewers, extending to about 2½ miles, varying in diameter from 30 in. to 9 in., for the T.C. Mr. G. Somervel Carfrae, Engineer, 1, Erskine-place, Edinburgh. Deposit £1.

*JANUARY 17.—**Sevenoaks.**—SEWER.—Extension of the sewer in Sandy-lane, Chipstead, in the parishes of Chevening and Riverhead, for the R.D.C. The works will comprise the laying of 1,232 of 6 in. stoneware pipe sewers, including concrete for 402 ft., construction of manholes, &c. Mr. J. N. Prior, No. 1, The Paddock, Westerham. Deposit £2 2s.

JANUARY 18.—**Chadderton.**—ROAD.—For construction of road in detail, for the U.D.C. Messrs. J. Diggle & Son, engineers, 14, Brown-street, Manchester. Deposit £5.

JANUARY 19.—**Hexham.**—SEWERAGE WORKS.—Laying of about 3,200 lineal yards of sewer with sanitary pipes in sizes varying from 6 to 9 inches, and construction of sedimentation tanks and filters, at Acomb, for the R.D.C. Mr. A. S. Dinning, Engineer, 21, Ellison-place, Newcastle-upon-Tyne.

JANUARY 20.—**Kettering.**—For the construction of waterworks for the Parish of Corby, for the R.D.C. Messrs. Pick, Everard & Keay, Engineers, 6, Millstone-lane, Leicester.

JANUARY 21.—**Dartford.**—SEWERAGE WORKS.—The time for receipt of tenders for an extension of the main outfall works at Dartford for the West Kent Main Sewerage Board has been extended to above date. Mr. S. R. Lowcock, engineer, 6, Queen Anne's Gate, Westminster, S.W. Deposit £5.

JANUARY 28.—**Sutherland.**—ROADS.—Reconstruction of three portions of County roads, at Borgie, Rheanlairg, and Oykel, for the C.C. Mr. Archd. Argo, Clerk, County Clerk's Office, Golspie.

FEBRUARY 6.—**Camberwell.**—DUST REMOVAL.—For removal of street refuse, &c., for the B.C. Borough Engineer, Town Hall, Camberwell.

FEBRUARY 6.—**Stratford-on-Avon.**—WATER SUPPLY.—For sinking borehole and supplying pumping plant, for the T.C. Mr. F. W. Jones, Borough Engineer, Stratford-on-Avon. Deposit £2 2s.

FEBRUARY 13.—**France.**—SEWAGE WORKS.—The Municipality of Lille has a project for land drainage and sewage works in the area of Basse-Deule, the outlet of the town drainage system. United Kingdom firms who have executed such works are invited to tender. They should forward certificates, giving particulars of the conditions under which such works were executed, to the "Directeur des Travaux Municipaux, à la Maire de Lille," who will visé the documents and forward them to the adjudicating committee of the Municipality. Copies of the specification and plans have been applied for and will be available for inspection as soon as received in the Department of Overseas Trade (Room 84), 35, Old Queen-street London, S.W. 1.

Competitions.

(See Competition News, page 6.)

Auction Sales, Tenders, etc.

✱JANUARY 10.—**Canning Town.**—Messrs. Joseph Hibbard & Sons will sell, without reserve, by order of Messrs. W. W. Howard & Bros. & Co., at Crown and Commercial Wharves, Canning Town, stock of timber, the surplus stocks of plant and rolling stock. Auctioneers, 15, Newington Green, Islington, London, N.1.

✱JANUARY 11.—**Croydon.**—Messrs. Davis & Moon will sell, by Order of the respective Receivers for the Debenture Holders, *re* The Croydon Wood Workers, Ltd., and *re* The Associated Trading & Engineering Co., Ltd., at the workshops and premises, Nos. 11–17, Frith-road, Croydon, the whole of the machinery, plant and stock of the Woodworking & Toy Manufacturing Co. Auctioneers, 285, Borough High-street, London, S.E.1.

✱JANUARY 11.—**London, S.E.**—Messrs. Veryard & Yates will sell (without reserve), at 126, Norwood-road, S.E. (close to Tulse Hill station), useful timber, fittings and building materials. Auctioneers: 365, Norwood-road, S.E. 27.

✱JANUARY 12 AND 13.—**Bicester, Oxfordshire.**—Messrs. Buckell, Ballard & Pennington will sell, by direction of the Disposal Board, at Bicester Aerodrome, Oxfordshire (within 2 miles of L. & N.W. Rly. and G.W.R. main line stations), the buildings with the interior fittings, comprising two large double aeroplane sheds, and various other buildings and store sheds. Auctioneers, 8, Cornmarket-street, Oxford, and at Market-square, Bicester.

✱JANUARY 13.—**Cheshire.**—Messrs. Richardson will sell by order of the Controller, Timber Disposal Dept., at the Timber Mill, at Waste Hill Wood, Peckforton, Cheshire, the whole of the standing and felled timber on Waste Hill Wood, comprising a clear fall of the timber on about 134 acres, timber mill machinery and equipment. Auctioneers and Timber Surveyors, Stamford, Lincs.

✱JANUARY 17.—**Wittering, Northamptonshire.**—Messrs. Richardson will sell, by direction of the Disposal Board, at Wittering Aerodrome, Northamptonshire, adjoining the Great North-road (2 miles from Stamford, Mid., G.N. and L. & N.W. Railways, 9 miles from Peterborough), the whole of the brick and timber frame buildings. Auctioneers, 15, Barn Hill, Stamford and Bourne.

✱JANUARY 24.—**Cambridgeshire.**—Barrington, Cambridgeshire (by order of the Senior Official Receiver and Liquidator), in the matter of the Dreadnought Portland Cement Co., Ltd., freehold land and buildings known as The Dreadnought Portland Cement Works, with an area of about 151¼ acres, connected with Foxton Station (G.E. Rly.) by light railway about 1¼ miles in length. Particulars, Robinson & Roods, surveyors, 37, Bedford-row, W.C.1.

✱JANUARY 24.—**Marston Thrift, Bedfordshire.**—Messrs. Joseph Hibbard & Sons will sell by Order of the Controller, Timber Disposal Department, Board of Trade, at the Depot, Woodend (2 miles from Marston Mortaine Station, L. & N.W. Rly.), stock of timber, plant and rolling stock, including 15,000 ft. cube round oak butts, portable engines, machinery, shafting, &c. Auctioneers, 15, Newington Green, Islington, London, N.16.

JANUARY 25.—**Ealing, W.**—Messrs. Knight, Frank & Rutley will offer for sale, as a whole or in lots (unless previously sold privately), freehold factory site, with about 688 feet frontage to Pope's-lane, the whole extending to an area of about 9½ acres, situate about 10 minutes from Acton Town and South Ealing Stations. Auctioneers, 20, Hanover-square, W.1.

✱FEBRUARY 2 AND 3.—**Liverpool.**—Messrs. George N. Dixon & Co. will sell, by order of the Housing Committee of the Liverpool Corporation, at the Edge-lane Depot, and the Edge-lane-drive housing site, the contractors' and builders' machinery, plant and materials. Auctioneers, 41, Castle-street, Liverpool.

✱FEBRUARY 15.—**Acton.**—Messrs. Daniel Smith, Oakley & Garrard will offer for sale at the London Auction Mart (Room E.), 155, Queen Victoria-street, E.C.2, freehold building site about 36,000 feet super forming part of The Elms Estate. Auctioneers, 4 and 5, Charles-street, St. James's-square, London, S.W.1.

✱NO DATE.—**Frampton, Gloucester.**—The Lease of the Frampton Gravel Pit, comprising an exceptionally large bed of the finest gravel, with all necessary buildings, plant, and up-to-date block-making machinery, to be sold by private treaty; siding connection to canal and the Midland Railway. Particulars, The Disposal Board, Room 669, Caxton House, Tothill-street, Westminster, S.W.1.

Public Appointments.

JANUARY 9.—**Tilbury.**—Inspector of Works required for Tilbury housing scheme. Mr. A. W. Buckner, Clerk to Tilbury U.D.C., Council Offices, Dock-road, Tilbury, Essex.

JANUARY 10.—**Croydon.**—Working Foreman of Works required by the Medical Superintendent of the Croydon Mental Hospital, Upper Warlingham, Surrey. Apply to the Medical Superintendent.

JANUARY 11.—**Cosham.**—Clerk of Works required by the C.B. of Portsmouth in connection with the Corporation's housing scheme on the Portsdown Hill site. Mr. F. J. Sparks, Town Clerk, The Town Hall, Portsmouth.

✱JANUARY 14.—**Cheshire.**—Clerk of Works required by the Cheshire County Council in connection with the Small Holdings and Allotments Committee. Mr. F. Anstead Browne, Deputy County Architect, 16, Nicholas-street, Chester.

JANUARY 16.—**London, S.W.4.**—Principal required of the London County Council School of Building, Ferndale-road, Clapham, S.W.4. Salary scale £350 to £1,000 a year by annual increments of £50. Apply Education Officer (T.1A), New County Hall, S.E.1.

PROPOSED NEW BUILDINGS AND OTHER WORKS.*

In these lists care is taken to ensure the accuracy of the information given, but it may occasionally happen that, owing to building owners taking the responsibility of commencing work before plans are finally approved by the local authorities, "proposed" works at the time of publication have been actually commenced. Abbreviations:—T.C. for Town Council; U.D.C. for Urban District Council; R.D.C. for Rural District Council; E.C. for Education Committee; B.G. for Board of Guardians; L.C.C. for London County Council; B.C. for Borough Council; and P.C. for Parish Council.

ABERDEEN.—A new bridge at Corf House, estimated to cost £8,000, has been approved of by the T.C.—Plans passed: Business premises, 475-485, Union street, for J. Scott & Son, Ltd., plasterers, per Messrs. Wilson & Walker, architects; salt store, North Esplanade (West) for Davidson (Aberdeen), Ltd., per Messrs. Tawse & Allan, architects; alterations on premises at the junction of Stell-road with Poynernook-road, for the Aberdeen Ice Manufacturing Co., Ltd., per Mr. D. M'Bride, architect, Glasgow; office at 5 and 7, Holborn-street, for William Kennaway, Ltd., per Messrs. Wilson & Walker, architects; car shed, North Deeside-road, for the Aberdeen Suburban Tramways Co., Ltd., per Messrs. Brown & Watt, architects.

ABERGAVENNY.—The Ministry of Health have sanctioned a scheme of the Abergavenny Town Council for the erection of sixteen houses. The successful tender was that of the Building Guild, Ltd., Cardiff.

ARBROATH.—The directors of the Infirmary have approved of plans for extending the buildings at an estimated cost of about £5,000, and a special meeting is to be held to deal with the whole question.

BALLYCASTLE.—The Board of Guardians has approved plans for a hospital at an estimated cost of £2,000.

BARNSLEY.—Messrs. Senior & Clegg have been appointed architects for the rebuilding of the premises belonging to Messrs. Smith & Marshall, drapers, Market-hill, Barnsley. The premises were destroyed by fire three weeks ago, the damage done amounting to approximately £20,000.

BARNSLEY.—Plans have been approved for alterations and additions to a large residence in Mount Vernon-road, Barnsley, for Mr. J. Rushby. The architect is Mr. P. A. Hinchliffe, of 19, St. James'-street, Sheffield.

BATH.—The T.C. has decided to grant a lease of 32, Stall-street to Messrs. Goodrich Bros., wholesale clothiers, on condition that not less than £1,000 be spent on alterations.—Plans approved:—Printing-room, 33, Westgate-street; alterations, 8, George-street.

BURNLEY.—Plan passed: Heald store, Springfield Mill, Waterloo-road. Messrs. Lancaster Bros., Ltd.

CHAPEL-EN-LE-FRITH.—Plans passed by U.D.C.: New store, Sicklehome, Bamford, Mylan & Smith, owners: Bank, Horwich End, Williams Deacon's Bank, Ltd., owners; house, Veinbutts, Hope, Mr. Jos. Robinson, owner; conversion of barn to cottage, Castleton, Mr. J. Walker, owner; dye-mixing room, Whitehall Works, Chinley, Messrs. J. Welch & Sons, Ltd., owners; stable, Blackbrook, Chapel-en-le-Frith, Mr. J. Marchington, owner; garage, opposite Whitehough Old Hall, for Mrs. Williams.

CHELMSFORD.—The T.C. at a special meeting, has decided to put before the Ministry of Transport a scheme for a new main road from Springfield-road to Duke-street, at an estimated cost of £36,000.

CHESTERFIELD.—Plans passed by T.C.: Four wash-houses, in Albion-road, West Park, for Mr. Geo. Webber; conversion of ash-place into a boot repairing shop, in Factory-yard, Hipper-street, for Mrs. Hannah Dickens; alteration and addition to property in Chatsworth-road, adjoining Brickhouse-yard, for Mr. Benjamin Smart

FALKIRK.—The T.C. has been informed by the Scottish Board of Health that the Board are prepared to allocate to Falkirk, in addition to the 150 houses already approved, a further 60 houses

FOGGATHORPE.—Plans are being prepared for a new chapel.

GELLIGAER.—Mr. F. O. Stamford, an inspector of the Ministry of Health, has held an inquiry into an application by the U.D.C. for sanction to proceed with schemes estimated to cost £54,000 for the construction of subsidiary sewers in the Deri, Cascade, and Cylla Valleys to connect with the Rhymney Valley main trunk sewerage.

GLASGOW.—At a sitting of the Dean of Guild Court, the applications of the Corporation to form roads and sewers at Kelvindale was granted, as was also lining for the erection of a picture theatre at Linthouse. The cost of the cinema house is estimated at about £29,000. The following linings were also granted by the Court: William M'Ewan & Co., Ltd., brewers, Fountain Brewery, Edinburgh, to make alterations and additions to offices in Port Dundas-road at Milton-street; John M'Kinnon Stuart, writer, 108, West Regent-street, secretary and treasurer, Haggs Castle Golf Club, Dumbreck, to convert existing house into golf clubhouse at 70, Dumbreck-road, Mosspark; Harland & Wolff, Ltd., shipbuilders, Govan, to erect new gatehouse and ambulance room in Clyde Foundry, Helen-street, Govan; Corporation of Glasgow (Housing Department), to form streets and sewers at Kelvindale; Macfarlane, Lang & Co., Ltd., Wesleyan-street, to erect a repair shop at Broad-street; Montgomery & Co., Ltd., Bermaline Factory, 10, Fairley-street, Govan, to erect a new steel and concrete floor at that address; Catholic Young Men's Society, Springburn Branch, to erect a temporary building for hall at Barcaple-street, Springburn; Pollok Division Ex-Service Men's Club, to erect club premises at junction of New Titwood-road and Minard-road, Crossmyloof; John Graham, 29, Rowallan-gardens, Broomhill, to reconstruct picture house at 95, Dumbarton-road; Kelvinside Academy Co., Ltd., to erect additional class-rooms at Kelvinside Academy, Bellshaugh-road; James Boyd, architect, 58, West Regent-street, to erect a picture house at George-drive at Holmfauldhead-road, Linthouse; William M'D Munro, 17, Borden-road, Jordanhill, alterations to dwelling-house at that address; Corporation of Glasgow (Parks Department), to build a curator's house in Victoria Park, Whiteinch.

GOUROCK.—The T.C. has decided to erect new municipal buildings on the site in Shore-street which they acquired several years ago for the purpose. It is anticipated that the work will be commenced shortly after the New Year. It is expected that the county authorities will also proceed with the erection of a new police station adjoining the Municipal Buildings, as an agreement to this effect was reached when the question was first considered.

HALIFAX.—Plans passed by T.C.: Paton & Baldwins, Ltd., new staircase, lavatory, &c., Clark Bridge Mills; Messrs. Greenwood Dawson, altering stable to garage, Argyle-street; Mrs. Edith Asquith, garage, 145, Huddersfield-road; Messrs. Jesse Robinson & Sons, garage, Hopwood-lane; Mr. George Normanton, porch, Albert-promenade; Messrs. Paton & Baldwins, Ltd., conversion of cottages to offices, Clark Bridge Mills; Mr. Ellis Wilde, water closet, Bottoms, Siddal; Mr. Percy O. Follett, division of mansion into three maisonettes, 7, Park-road; Trustees of the King Cross Wesleyan Church, sanitary improvement, Skircoat Moor-road; Mr. T. I. Spencer, additions, 4, Stafford-parade.

HESTON AND ISLEWORTH.—Plan passed by U.D.C.: Rebuilding of "Rising Sun" public house, London-oad, Isleworth, for Mr. Nowell Parr.

HUDDERSFIELD.—The Borough Architect has been instructed to prepare a scheme for open-air swimming baths.

HULL.—The Corporation Health Committee has agreed to the erection of a further 74 houses on the West Hull Estate, at an estimated cost of £55,000. They will not rank for Government subsidy or assistance.

HUNSLET.—The R.D.C. has resolved to prepare a town-planning scheme in respect of nearly 3,000 acres of land in the parishes of Templenewsam and Thorpe Stapleton.

ILFORD.—Plans passed by U.D.C.: L.C.C., house drainage, roads 27, 28, 29 and 31; Mr. W. J. Hobbs, houses, Clarence-avenue; Mr. H. E. Seabright, addition, 25, Quebec-road; Mr. S. Wood, addition, 29, Quebec-road; Mr. A. P. Griggs, garage and bedroom, 94, St. Andrews road; Mr. F. J. Tallboy, drainage, Granton and Green-lane; L.C.C., house drainage, road No. 20, section 1, sub-section e; Ministry of Transport, Roads Department, two wooden buildings, Eastern-avenue; Mr. T. L. Hughes, recreation room, High-road; Mr. T. L. Daniel, showroom, 88, Beehive-lane; Mr. T. W. Flory, garage, 66, Aberdour road; Mr. J. W. Stammers, shed, 75, Wellesley-road; Messrs. Spencer & Wildman, 79, Gresham-street, E.C.2., temperance billiard hall, High-road; Banks-Martin, Hammond & Co., 121, Plashet-grove, East Ham, public house, Ilford-lane; Mr. W. E. Trent, 6, Broad-street-place, E.C., new cinema, Balfour-road; Councillor G. Cushing, timber sheds, garage and office, High-road.

ILKESTON.—Plans passed by T.C.: Wooden workshop, &c., Burr-lane, for Mr. A. Williams; cottage, Stanton-road, for Mrs. A. Ormond.

ISLE OF AXHOLME.—A plan for a house and shop in King Edward-street, Belton, for Miss M. Mason, presented by Messrs. Thompson & Dixon, of Doncaster, has been approved by the U.D.C.

KIDSGROVE.—Mr. R. C. Cox, an Inspector of the Ministry of Health, has held an inquiry into the application of the U.D.C. to borrow £28,500 for purposes of sewage disposal, including the execution of works in Church Lawton in the Congleton rural district.

LANCASTER.—Plans passed by T.C.:—Drain Ashton-road, for the British Petroleum Co., Ltd.; motor garage, 56, Aldcliffe-road, for Mr. T. G. Leytham; washhouse, 32, Cromwell-road, for Mr. Joshua Barber; hut, 9, West-road, for Mr. Anthony Porter.

LINCOLNSHIRE.—At a meeting of the Roads and Bridges Authority of the Holland (Lincolnshire) County Council it was resolved to recommend the Council to adopt a scheme of road construction at a cost of £90,000. The roads proposed to be dealt with are sections of the Boston-Sleaford, Sleaford-King's Lynn, Boston-Spalding, and Spalding-Wisbech roads.

LONDON (BERMONDSEY).—Drainage: Heroldes Institute, for Douglas Halse & Co., Ltd.; lavatory, &c., Sparricks-row, Weston-street, for Messrs. Harrington & Evans; drainage, garage, Columbia Wharf, for Mr. L. Harris.

LONDON (ST. MARYLEBONE).—Drainage plans passed by B.C.:—At 9 and 10, St. Edmund's-terrace, by Mr. F. H. Hall, for Messrs. Wright and Mrs. Corjiag.

LOUGHBOROUGH.—The Director-General of Housing will agree to the T.C. erecting an additional twenty houses provided that the tenders are reasonable.

MANSFIELD.—Plans passed by T.C.:—Mr. A. Wardle, covered way to house, Normanton-drive; Mr. W. J. Hutchinson, saw mills, &c., Chesterfield-road; Mr. H. Heane, motor garage, Norfolk-drive; Mr. H. James, jun., timber drying shed, Grove-street.

MILLOM.—The report of Mr. Beswick, A.M.I.C.E., of Whitehaven, who was engaged by the U.D.C. to inspect and report upon the proposed new source of additional water supply from Whitecombe Beck, states that water from this beck is pure, and free from contamination. He recommends that a balancing reservoir be built at Gill Scar, to supplement the supply from the existing

* See also our List of Contracts, Competitions, etc

reservoir, which has a storage capacity of 29,000,000 gallons. The approximate cost, including other requirements of the scheme, would be £12,000.

NEWTON.—The U.D.C. has passed plans of an Army hut for Sunday School for All Saints' Church.

NORTHAMPTON.—Plans passed by T.C.: Alterations and drainage to Jubilee Hall, Franklin's-gardens, Weedon-road, for Messrs. P. Phipps & Co., Ltd.; drainage to motor house, 16, Oliver-street, for Mr. W. Arnold; motor house and alterations, Park-avenue, for Mr. A. Dickens; garage, Woodland-avenue, for Mr. H. A. Glenn; additions to factory, Robert-street, for Mr. F. J. Tarry; drainage, St. George's street, for Mr. A. P. Wilkinson; garage, Newland, for Mr. W. G. Taylor; additions, 12, Park-street, for Mr. Seaby.

POPLAR.—Plans passed by B.C.: Messrs. F. & T. Thorne, L.C.C. Ambulance Station, corner of Woolmore-street; Mr. Harry Moscovitz, drainage, 61, West India Dock-road; Messrs. E. Pollard & Co., Ltd., drainage, &c., at 230 and 230A, East India Dock-road; Messrs. R. W. Price & Sons, drainage at St. Andrew's Wharf, West Ferry-road; Messrs. Eley & Allan, redrainage of 7 to 15, Box-street, and 1, Furze-street; Mr. W. Harris, additional drainage at Mellish's Oil Wharf, West Ferry-road.

PRESTON.—Plans passed by T.C.: Mr. W. D Standen, for Mr. T. L. Robinson, alterations and additions, 22 and 23, Friargate; Mrs. Margaret Waterhouse, wash-house, 194, Emmanuel-street; Mr. H. A. Thomas, lavatory, &c., Fleetwood-street, Tivoli Picture Hall; Mr. F. E. Jackson, for Mr. William Kellett, garage Addison-road; Mr. Myles Myers, for Mr. Joseph Eccles, two houses, Frenchwood-avenue; Messrs. Dilworth & Carr, additions, Bow-lane; Mr. W. D. T. Munford, for the Union Bank of Manchester, reconstruction, &c., 32, Fishergate; Mr. A. C. M. Lillie, for Messrs. Atkinson & Co., alteration to lay-out, Frenchwood-avenue; Mr. G. Reed, wood buildings, Corporation-street and Hope-street; Mr. T. E. Lofthouse, alterations and extension, 415, New Hall-lane; Mr. E. J. Andrew, alteration and extension, Sizehouse-street.

RYE.—Plans passed by R.D.C.:—Alterations and additions at Loganberry Cottage, for Mrs. Bledell; bungalow at Broomhill, for Mrs. K. Marchant; two bungalows at Broomhill, for Mr. Fletcher.

SALFORD. — Plans passed by T.C.: Construction of party wall and roof, 15 and 17, Great Clowes-street, Broughton; garage and stores, 85 and 87, Great Clowes-street, Broughton; lift, Adelphi-street, Salford; engineering works, Frederick-road, Pendleton; alterations to dwelling-house, New Hall-road, Broughton; drying room, Messrs. I. Bury's Works, Blackburn-street, Salford; construction of fire escape, Brown-street, Salford; sanitary accommodation, Raven Hotel, Chapel-street, Salford; stores, Croft-street and Sussex-street, Salford; garage and repair shop, Wilburn-street Depôt, Salford; group drainage to dwelling-houses, 47–51, Seedley-road, Pendleton; loading way and stores, Dickinson-street, Salford; alterations to St. Bartholomew's Schools, Regent-street, Salford; bank premises, 301, Chapel-street, Salford; show-room, junction of Broad-street and Statham-street, Pendleton; additions to bakery, Park-street, Salford; additions, Zama Works, Florin-street, Pendleton.

SELBY.—The Ministry of Health has sanctioned the U.D.C. erecting 13 additional houses.

SOUTHEND-ON-SEA.—Plans passed by T.C.:—House, Maple-avenue, for Mr. A. Crane; conservatory, "The Woodlands," Theobalds-road, for Mr. A. Gyte; house and workshop, Station-road, Thorpe Bay, for Mr. J. Wilson; bungalow, Leighton-avenue, for Mr. G. W. Eves; two houses, shop and one workshop, London-road, for Mr. P. H. Evans; house, Westleigh-avenue, for Mr. T. Conner; scullery, 5, Princes-street, for Mr. T. Hough; workshop, Fernleigh-drive, for Mr. G. W. Eves; garage, "Kimbolton," The Leas, for Mr. A. Goodman; additions, 22, Whitegate-road, for Mr. B. Kosse; two houses, Marine Parade, Leigh-on-Sea, for Mr. A. Hood; bay window, "Franfield," Cumberland-avenue, for Mr. H. W. Boote; bungalow and garage, Scarborough-drive, for Messrs. Gardner & Ball; conservatory, 36, Ditton Court-road, for Mr. H. Ward; garage, Northview-drive, for Mr. A. Dasnieres; house, Salisbury-road, for Mrs. L. E. Hazelgrove; garage, Britannia-road, for Mr. F. Horner; alterations, "Ivy House Hotel," Marine Parade, for Mr. A. G. Pratt; alterations and additions, 159, Leigh-road, for Mr. T. J. Cowey; three bungalows, Carlingford-drive, for Mr. J. Quinn; two bungalows, Duke of Manchester-drive, for Mr. A. Butt; bungalow, Olivia-drive, for Mrs. S. Grayston; stable and cart-shed, South-avenue, for Mr. H. Wilkinson; additions, 65, Ronald Park-avenue, for Mr. W. Hoy; alterations and additions, 53, South church-road, for Mr. H. G. Axcell; 26 houses, Barnstaple-road, for the Southend-on-Sea Estates Co., Ltd.; 10 houses, Lonsdale-road, for Mr. D. J. Standen; garage, "Braeside," Lord Roberts-avenue, for Mr. F. W. Newton; two flats, Ronald Park-avenue, for Mrs. E. Rutt; bay window, "Waverley," Elm-road, for Mr. T. Edwards; two houses, Branksome-road, for Messrs. Sears & Co.; bungalow, Scarborough-drive, for Messrs. Gardner & Ball; alterations and additions, 16, St. John's-road, for Mr. S. Lewis, jun.; conversion of house into shop, 11, Queen's-road, for Mr. A. Quest; garage, "Bridgeside," Thorpe Hall-avenue, for Capt. T. Dixon; bungalow, Branksome-road, for Mr. S. H. Turner; conservatory, "Jesmond Dene," Cricketfield-grove, for Mr. A. Cardwell.

SOUTH SHIELDS.—The T.C. propose to carry out two additional schemes of road construction as relief work for the unemployed, involving a further expenditure of £60,000. The schemes provide for the widening and diversion of Harton-lane, and the construction of a new vehicular road between Stanhope-road and St. Mary's Church.

SWANSEA.—Plans approved by the T.C.:—Additions, The Cottage, Limeslade, for Mr. T. Roderick; alterations, 266, Oxford-street, for Messrs. Upson, Ltd.; additions, Llangyfelach-road, Brynhyfryd, for Mr. P. Valardo; garage, 54, Hawthorne-avenue, for Mr. Ed. Rees; bakehouse, Heol-las, for Mrs. A. Pyart; shed, Pwll-street, Landore, for Mr. E. Spooner; classrooms, Newton-road, Mumbles, for Miss Pinkham; additions Cameron Hotel, High-street, for Mr. Charles Gustavus; additions, 29, Oxford-street, for Mr. R. Rossi; additions, 192, Dinas-street, Landore, for Mr. R. Lobbett; garages, 62 and 64, Bryn-road, for Mr. David Hinds; washhouse, Eversley-road, for Mr. D. J. Thomas; garage, Walter-road, for Dr. Scurlock; warehouse, Strand, for the Decorators' Supply Co.; house and lock-up shop, Pleasant-street, Morriston, for Mr. D. Francis; garage, 1, Woodville-road, Mumbles, for Mr. G. H. Frizell; bakehouse, 69, Pentregethin-road, for Mr. E. Yeandle; two bungalows, Hendrefolian-road, for Mr. F. B. Rott; workshop, Neath-road, Landore, for Messrs. J. MacKenna, Ltd.; bungalow, Silvia-terrace, Brynhyfryd, for Mr. T. Gowman; schoolroom, The Grove, Uplands, for the Trustees of the Henrietta-street Chapel; garage, 108, Bryn-road, for Mr. Latimer; garage, York-street, for Mr. Wm. Ackland; two houses, Kingston-road, for Mr. C. Tyler; house and shop, Carnglas-road, for Mr. D. Williams; dairy, 169, Port Tennant-road, for Mr. W. J. Manning.

WALLASEY.—The T.C. has decided to apply to the Ministry of Health for a provisional order to empower them to reconstruct and enlarge the Seacombe pier and landing-stage.

WESTON-SUPER-MARE.—Plans for a number of houses of a superior class have been passed recently by the U.D.C.

WINNIPEG.—H.M. Trade Commissioner at Winnipeg reports that a considerable hospital extension is to be effected in Western Canada in the spring, and the architect requests manufacturers of building materials in Great Britain to forward him catalogues. His name can be obtained from the Dept. of Overseas Trade, 35, Old Queen-street, S.W.

WITHERNSEA.—The U.D.C. has passed plans for a shop, flats, &c., in Queen-street, for Mr. C. C. Lockey, architect.

FIRES.

BOLTON.—The assembly hall of St. Peter's and St. Paul's Roman Catholic Schools has been destroyed by fire.

DALBEATTIE.—A serious outbreak of fire has occurred which resulted in the complete destruction of motor engineering works belonging to Mr. J. B. Sheoch, and the glove factory of Messrs. M'George.

GLASGOW.—Damage to the extent of £20,000 has been caused by fire in a warehouse of Messrs. Seagoll, Sneader & Co., wholesale clothing manufacturers, Mitchell-street.

HALESOWEN.—A serious fire has occurred, the premises involved being those of the Hales Owen Steel Company, the offices of the Midland Railway Company, and the mattress factory of the Hales Owen Cycle and Perambulator Co., which are all situated at the bottom of Mucklow's Hill. The damage is estimated at over £50,000.

HAWICK.—Damage by fire has been done to business premises in High-street occupied by Mr. J. W. Borthwick, Mr. C. Justice and Johnstone. The owner is Mr. J. Aitken.

HEBDEN BRIDGE.—A fire broke out at the motor garage of Messrs. A. & H. Hopwood, Mayroyd, and the premises were practically destroyed.

LEWES.—Damage estimated at £1,000 was caused by a fire near Ham-lane which destroyed several buildings, &c., belonging to Mr. T. Rowlands.

MERTHYR TYDVIL.—The Merthyr Steam Laundry has been destroyed by fire.

NEWCASTLE.—A fire has occurred at a warehouse in White Hart-yard, off the Cloth Market, occupied by Messrs. Bell & Foster, agents for fancy goods.

PORTHCAWL.—A serious fire has occurred causing considerable damage to property in John-street, belonging to Mr. J. T. Dare, baker, of York Café, and Mr. J. Power, the occupier of a dwelling-house.

POTTERS BAR.—A fine old country house, known as View Lodge, near Potters Bar, has been nearly destroyed by fire, the damage being estimated at £5,000.

STIRLING.—A fire has occurred in the barn at Poppletrees Farm, Throsk, near Stirling, occupied by Messrs. J. & S. Patterson.

SOUTHPORT.—A fire has occurred at the offices of the *Southport Visitor* in Tulketh-street, and a considerable amount of damage was done.

SPENNYMOOR.—Messrs. Hodgson & Co.'s large motor garage and repairing works in James-street have been destroyed by fire.

WOLVERHAMPTON.—A fire has occurred at the works of John Thompson Motor Pressings, Ltd., Ettingshall. Considerable damage was done.

YEADON.—Damage estimated at £3,000 was caused by a fire at the works of H. S. Myers, wheelwright and coach builder, Peacock-lane.

DEEP-WATER QUAYS.

At the last meeting of the Institution of Civil Engineers, Mr. Ernest Latham, M.Inst.C.E. read a paper on "Deep-Water Quays: General Considerations of Design," in the course of which he discussed the relative advantages of open piled structures and quays designed on the "cylinder" system—the "cylinder" system in general being preferred by the author. The relative advantages of a jetty and dolphins, and a continuous quay, were reviewed and discussed. The author pointed out that on a continuous quay-face, constant attention to mooring ropes was necessary, and an example of the mooring of a 12,000-ton ship in the Thames estuary was illustrated. The suggestion of a compromise between a jetty and dolphins and a deep-water quay, was thrown out, and such a design now under course of construction was given in general outline.

Mr. F. E. Wentworth-Sheilds, in a paper entitled "The Stability of Deep-Water Quay Walls," pointed out that no general agreement had been reached as to the best way of estimating the forces and resistances acting on a retaining wall with earth backing and on an earth foundation. The solution of such problems was so unsatisfactory that many engineers discarded their calculations, even when they had made them, and trusted to their judgment in deciding whether a wall as designed would be stable. That was especially true of deep-water quay walls, whose problems were quite different from those of land walls, owing to the presence of water which crept underneath and behind them. A quay wall might be considered as acted upon by certain outward horizontal forces, such as the lateral pressure of backing, &c., which must be balanced by inward horizontal forces, such as the pressure of water in front of the wall, the lateral resistance of earth in front of the toe, the resistance due to friction at the base, &c. It was also acted upon by certain vertical forces, of which the downward forces, such as the weight of the wall, &c., must be balanced by the upward forces, such as the upward pressure of water and earth beneath it. Moreover, the sum of the moments of all those forces about any point must be zero, or the wall would overturn. As regards the outward forces, the most important was the lateral pressure of the earth backing, for estimating which engineers generally used Rankine's formula. Mr. Crosthwaite's experiments showed that to obtain accurate results with sand the value of ϕ should be greater than the angle of repose; and Mr. Bell had shown that the formula needed modification in the case of clay. If the backing was flooded, it was suggested that the intensity of its pressure should be estimated as that of water, whose free surface was at soakage level, or of the earth alone, whichever was the greater. Loads on the quay were generally taken at about 2 cwt. per sq. ft., and heavy point loads might be regarded as dispersed over a certain area. As regards the inward forces, it seemed right to include the pressure of water in front of the wall at its lowest level. Rankine's formula was generally used for estimating the resistance of the earth in front of the toe, but there again, in the case of sand, ϕ had probably a higher value than the angle of repose, and clay called for a modification of the formula. It seemed doubtful whether water overlying the earth in front of the toe could be considered as increasing its resistance. A sloping base to a wall would appear to produce an inward resistance. Friction between the wall and the earth beneath it was generally obtained by deducting the other inward forces from the outward forces. The result ought to be definitely less than the permissible friction, which was usually estimated by multiplying the weight on the base, less the upward pressure of water under it, by a suitable co-efficient. Such co-efficient in the case of clay might be little or nothing. The vertical downward forces were generally assumed to include all materials—masonry, earth and water—directly over the base. The friction between the backing and the back of the wall was usually ignored, though in certain cases it might come into play. The upward vertical forces were generally assumed to include pressure of water under the base due to a head equal to the height between the base and the lowest water-level. The friction between the toe and the earth in front of it was commonly ignored. The remaining force, which was the upward resistance of the earth under the wall, was found by deducting the other upward forces from the downward forces. Then by taking moments of all forces about any point, the position of the resultant of the earth resistance would be found, and hence its greatest intensity. That again should be definitely less than the permissible resistance or bearing power of the earth, which was estimated in various ways, and in many cases could be determined by experiment.

PRICES CURRENT OF MATERIALS.*

[Owing to the exceptional circumstances which prevail at the present time, prices of materials should be confirmed by inquiry. Since our last issue various revisions have been made.—Ed.]

BRICKS, &c.

Per 1,000 Alongside, in River Thames up to London Bridge. £ s. d.

Best Stocks 4 13 0

Per 1000, Delivered at London Goods Stations.

	£ s. d.		£ s. d.
Flettons	3 12 0	Best Blue Pressed Staffs.	11 1 6
Do. grooved for plaster.....	3 14 0	Do. Bullnose ..	11 11 6
Do. Bullnose ..	4 7 0	Blue Wire Cuts	9 4 0
Best Stourbridge Fire bricks:—			
2½ in.	11 18 0	3 in.	14 2 0

GLAZED BRICKS—

Best White, Ivory, and Salt Glazed Stretchers ..	26 0 0	D'ble Str'tch'rs	34 10 0
		D'ble Headers	31 10 0
		One Side and two Ends ..	35 10 0
Headers.....	25 10 0	Two Sides and one End	36 10 0
Quoins, Bullnose and 4½in. Flats	32 10 0	Splays and Squints.....	34 0 0

Second Quality, £1 per 1,000 less than best. Cream and buff, £2 extra over white. Other colours, Hard Glaze, £5 10s. extra over white.

	s. d.		
Thames Ballast	14 0	per yard,	delivered 2 miles radius Paddington.
Pit Sand	17 0	„ „	
Thames Sand	19 0	„ „	
Best Washed Sand	19 0	„ „	
½ in. Shingle for Ferro-Concrete	19 0	„ „	
¼ in „ „	20 0	„ „	

Per ton delivered in London area in full van loads.

	£ s. d.		£ s. d.
Best Portland Cement. British Standard Specification Test.....	3 17 6	..	4 0 3
70/6 alongside at Vauxhall in 80-ton lots.			
Ferrocrete per ton extra on above			10 0

NOTE.—The sacks are charged at 2s. 3d. each and credited at 2s. each if returned in good condition within three months, carriage paid.

Best Ground Blue Lias Lime 2 12 0 at rly. depot.
Grey Stone Lime 65s. 0d. per ton delivered in City and Central districts.
Stourbridge Fireclay in s'cks 37s. 8d. per ton at rly. dpt.

STONE.

	s. d.
BATH STONE—delivered in railway trucks at Westbourne Park, Paddington, G.W.R., or South Lambeth, G.W.R.. per ft. cube.....	3 2½
Do. do. delivered in railway trucks at Nine Elms, L. & S.W.R.. per ft. cube	3 5½
Do. do. delivered on road wagons at Nine Elms Depot	3 6½
PORTLAND STONE—	
Brown Whitbed, in random blocks of 20 ft. average, delivered in railway trucks at Nine Elms, L.& S.W.R., South Lambeth Station, G.W.R., and Westbourne Park, Paddington, G.W.R., per ft. cube	4 11½
Do. do. delivered on road wagons at above stations, per ft. cube..	5 0½
White basebed, 3d. per ft. cube extra.	
NOTE.—½d. ft. cube extra for every foot over 20 ft. *average*, and ½d. beyond 30 ft.	
YORK STONE, BLUE—*Robin Hood Quality.*	
Delivered at any Goods Station London.	s. d.
6 in. sawn two sides landings to sizes (under 30 ft. super.) .....Per Ft. Super	7 4½
6 in. rubbed two sides, ditto ..... „	8 0½
3 in. sawn two sides slabs (random sizes) „	3 3
2 in. to 2½ in. sawn one side slabs (random sizes) ..... „	2 1
1½ in. to 2 in. ditto, ditto ..... „	1 9
HARD YORK—	
Delivered at any Goods Station London.	
Scappled random blocks .....Per Ft. Cube	8 0
6 in. sawn two sides landing to sizes (under 40ft. super.) .....Per Ft. Super	7 0
6 in. sawn two sides ditto ..... „	8 0
4 in. sawn two sides slabs (random sizes) „	3 11
3 in. ditto, ditto „	3 1
2 in. self-faced random flags ..Per Yard Super	10 6

WOOD.

GOOD BUILDING DEAL.

Inches	£ s.	
4 × 11	36 0	per standard
4 × 9	35 0	„
4 × 8	30 0	„
4 × 7	30 0	„
3 × 8	30 0	„
3 × 7	25 0	„
2½ × 7	25 0	„
3 × 6	25 0	„
3 × 11	34 0	„
2 × 11	32 0	„
3 × 9	30 0	„
2½ × 9	30 0	„
3 × 4½	20 10	„
3 × 4	20 10	„

PLANED BOARDS.

1 × 11	45 0	„
1 × 9	40 0	„

PLAIN EDGE FLOORING.

Inches		
½	20/-	per square
¾	22/6	„
1	25/-	„
1¼	30/-	„
1½	37/6	„

TONGUED AND GROOVED FLOORING.

Inches		
1	25/-	per square
1¼	30/-	„
1½	37/6	„

WOOD (*Continued*).

MATCHINGS (BEST).

Inches		
½	17/6	per square
¾	20/-	„
1	25/-	„

BATTENS.

Inches	s. d.	
½ × 2	3 0	per 100 ft.

SAWN LATHS.

Per bundle	0 4	0

Dry Wainscot Oak, per ft. super, as inch	0 2 6	to	0 3	0	
½ in. do. do.	0 1 10½	to	0 2	6	
Dry Mahogany—Honduras, Tabasco, African, per ft. super, as inch	0 2 3	to	0 3	0	
Cuba Mahogany	0 3 6	to	0 4	0	
Teak (Rangoon, Moulmein or Java), per load.. ..	52 10 0	to	55	0	0
American Whitewood planks, per ft. cube ..	0 16 0	to	0 18	0	
Best Scotch Glue, per cwt.	9 5 0	to	—		
Liquid Glue, per cwt.....	5 3 0	to	6 10	0	

SLATES.

1st quality slates from Bangor or Portmadoc in truck load delivered London area. Per 1,000 of 1,200.

		£ s. d.
Best Blue Bangor Slates,	24 by 12	46 10 0
„ „	22 by 12	42 5 0
First quality" „	22 by 11	39 0 0
„ „	20 by 12	37 2 6
Best Blue Portmadoc	20 by 10	31 15 0
	18 by 10	26 5 0
First quality „	18 by 9	23 2 6
„ „	16 by 10	22 0 0
„ „	16 by 8	17 2 6

TILES.

	Per 1,000 f.o.r. London. £ s. d.
Best machine-made tiles from Broseley or Staffordshire district.....	7 0 0
Ditto hand-made ditto.....	7 15 0
Ornamental ditto	8 0 0
Hip and valley tiles (per dozen)	0 12 0

METALS.

JOISTS, GIRDERS, &c., TO LONDON STATION PER TON—

	£ s. d.
R. S. Joists, cut and fitted	14 10 0
Plain Compound Girders	16 10 0
„ Stanchions	18 0 0
In Roof Work	22 0 0

WROUGHT-IRON TUBES AND FITTINGS—
(Discount off List for lot of not less than £15 net value delivered direct from works. 5 per cent. less above gross discounts, carriage forward if sent from London stocks.)

	Tubes. ½" to 2".	2½" to 6".		Fittings. ½" to 2".	2½" to 6".
Gas.....	37½	40	..	35	40
Water	30	32½	..	30	37½
Steam	22½	25	..	25	35
Galv'd Gas	21½	25	..	27½	32½
„ Water	12½	16½	..	22½	30
„ Steam	3½	7½	..	17½	27½

L.C.C. COATED SOIL PIPES—London Prices ex works.

	Pipe. s. d.		Bends, stock angles. s. d.		Branches, stock angles. s. d.	
2 in. per yd. in 6fts plain	5 1	..	3 7	..	4 4	
2½ in. „ „	6 1	..	3 11	..	5 5	
3 in. „ „	7 3	..	4 4	..	6 6	
3½ in. „ „	7 11	..	5 5	..	7 6	
4 in. „ „	9 1½	..	6 1	..	8 7	

RAIN-WATER PIPES, &c.

	Pipe. s. d.		Bends, stock angles. s. d.		Branches, stock angles. s. d.	
2 in. per yd. in 6fts. plain	3 9	..	2 2	..	3 0	
2½ in. „ „	4 2	..	2 7	..	3 6	
3 in. „ „	4 9	..	3 1	..	4 8	
3½ in. „ „	5 6½	..	3 9	..	5 6	
4 in. „ „	6 4	..	4 6	..	6 8	

L.C.C. DRAIN PIPES.—9 ft. lengths. London Prices, per yd.: 4 in., 6/10. .. 5 in., 8/- .. 6 in., 9/8.

IRON—	Per ton in London. £ s. d.			£ s. d.	
Common Bars	15 0 0	to	16 0	0	
Staffordshire Crown Bars – good merchant quality	16 0 0	..	17 0	0	
Staffordshire "Marked Bars"	19 10 0	..	20 15	0	
Mild Steel Bars	13 10 0	..	14 10	0	
Steel Bars, Ferro-Concrete quality, basis price ..	13 10 0	..	14 10	0	
Hoop Iron, basis price ..	21 0 0	..	22 0	0	
„ Galvanised ..	34 0 0	..	36 0	0	
Soft Steel Sheets, Black—					
Ordinary sizes to 20 g.	17 0 0	..	18 0	0	
„ „ „ 24 g.	18 0 0	..	19 0	0	
„ „ „ 26 g.	19 10 0	..	21 10	0	
Sheets Flat Best Soft Steel, C.R. & C.A. quality—					
Ordinary sizes, 6ft. by 2ft. to 3ft. to 20 g.	23 0 0	..	24 0	0	
Ordinary sizes, 6ft. by 2ft. to 3ft. to 22 g. and 24 g.	24 0 0	..	25 0	0	
Ordinary sizes, 6ft. by 2ft. to 3ft. to 26 g...	26 0 0	..	28 0	0	
Flat and Galvanised Corrugated Sheets—					
Ordinary sizes, 6 ft. to 9ft. 20 g.	22 10 0	..	23 10	0	
Ordinary sizes, 6ft. to 9ft. 22 g. and 24 g.	23 0 0	..	24 0	0	
Ordinary sizes, 6ft. to 9ft. 26 g.	25 0 0	..	27 0	0	

METALS (*Continued*).

	Per ton in London. £ s.		£ s. d.
Sheets Galvanised Flat, Best quality—			
Best Soft Steel Sheets, 6ft. by 2ft. to 3ft. to 20g. and thicker ..	27 0 0	..	28 0 0
Best Soft Steel Sheets, 22 g. and 24 g.	28 0 0	..	29 0 0
Best Soft Steel Sheets, 26 g.	30 0 0	..	31 0 0
Cut Nails, 3in. to 6in. ..	26 0 0	..	27 0 0
(under 3in. usual trade extras.)			

METAL WINDOWS—Standard sizes suitable for complete houses, including all fittings, painting two coats, and delivery to job, average price about 3s. per foot super.

LEAD, &c.

Delivered in London.

	£ s. d.		£ s. d.
LEAD—Sheet, English, 4 lb. and up	36 0 0	..	—
Pipe in coils	36 10 0	..	—
Soil Pipe	39 0 0	..	—
Compo pipe	40 0 0	..	—

NOTE—Country delivery, 30s. per ton extra; lots under 5 cwt., 1s. 0d. per cwt. extra. Cut to sizes, 2s. cwt. extra.

Old lead, ex London area, at Mills ..... per ton	22 0 0	..	—
Do., ex country, carriage forward..... per ton	23 0 0	..	—
COPPER—			
Strong Sheet ....per lb.	0 2 3	..	—
Thin „ .... „	0 2 4	..	—
Copper nails .. „	0 2 3	..	—
Copper wire .... „	0 2 4	..	—
TIN—English Ingots „	0 1 0	..	—
SOLDER—Plumbers' „	0 0 10	..	—
Tinmen's..... „	0 1 0	..	—
Blowpipe ..... „	0 1 3	..	—

GLASS.

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES AND IN SQUARES IN ORDINARY SIZES.

	Per Ft.		Per Ft.
15 oz. fourths	4½d.	32 oz. fourths	9½d.
„ thirds	5½d.	„ thirds	11d.
21 „ fourths	6½d.	Obscured Sheet, 15 oz.	7d.
„ thirds	8½d.	21 „	9d.
26 „ fourths .. .	7½d.	Fluted and Enamelled 15 „	11d.
„ thirds	8½d.	Enamelled 21 „	1/2

Extra price according to size and substance for squares cut from stock.

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

	Per Ft.
¼ Rolled plate	4½d.
⅛ Rough rolled	6d.
¼ Rough rolled	6½d.
Figured Rolled, Oxford Rolled, Baltic, Oceanic, Arctic, Stippolyte, and small and large Flemish white	7d.
Ditto, tinted	9½d.
Rolled Sheet	6d.
White Rolled Cathedral.....	5½d.
Tinted do.	7½d.

Cast Plate is same price as rough rolled.

PAINTS, &c.

		£ s. d.
Raw Linseed Oil in pipes.....	per gallon	0 3 2
„ „ „ in barrels	„	0 3 3
„ „ „ in drums	„	0 3 4
Boiled „ „ in barrels	„	0 3 7
„ „ in drums	„	0 3 9
Turpentine in barrels	„	0 6 1
„ in drums (10 gall.) ..	„	0 6 4
Genuine Ground English White Lead, per ton (In not less than 5 cwt. casks.)		58 0 0
GENUINE WHITE LEAD PAINT— "Father Thames," "Nine Elms," "Park," "Supremus" and other best brands (in 14 lb. tins) not less than 5 cwt lots .....per ton delivered		77 5 0
Red Lead, Dry (packages extra) .. per ton		41 0 0
Best Linseed Oil Putty ..... per cwt.		0 17 6
Filocol..... per cwt.		0 15 6
Size. X D Quality.....		fkn. 0 4 6

VARNISHES, &c.

	Per gallon. £ s. d.
Oak Varnish.....Outside	0 15 0
Fine ditto ..... ditto	0 17 2
Fine Copal ..... ditto	1 1 6
Pale Copal ..... ditto	1 2 6
Pale Copal Carriage ..... ditto	1 4 6
Best ditto ..... ditto	1 14 6
Floor Varnish..... Inside	0 19 0
Fine Pale Paper ..... ditto	0 18 6
Fine Copal Cabinet ..... ditto	1 2 6
Fine Copal flatting ..... ditto	1 0 6
Hard drying Oak ..... ditto	0 18 0
Fine Hard drying Oak ..... ditto	0 19 0
Fine Copal Varnish ..... ditto	1 0 6
Pale ditto ..... ditto	1 2 6
Best ditto ..... ditto	1 14 6
Best Japan Gold Size.....	0 12 6
Best Black Japan	0 18 0
Oak and Mahogany Stain (water)	0 17 6
Brunswick Black	0 11 9
Berlin Black.....	0 16 6
Knotting (patent)	1 18 0
French and Brush Polish	1 8 0
Liquid Dryers in Terebine	0 13 6
Cuirass Black Enamel	0 7 6

* The information given on this page has been specially compiled for THE BUILDER and is copyright. Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the highest or lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

CURRENT PRICES FOR BUILDING WORK IN LONDON.*

EXCAVATOR.

		s.	d.
Digging and throwing or wheeling and filling carts, and carting away to shoot—6 ft. deep	per yard cube	16	0
Add if in clay	„ „	1	10
Add for every additional depth of 6 ft.	„ „	1	4
Planking and strutting to trenches	per foot super	0	7
Do. to sides of excavation, including shoring	„ „	1	2

CONCRETOR.

		s.	d.
Portland cement concrete in foundation 1 to 6	per yard cube	43	0
Add if in underpinning in short lengths	„ „	9	6
Add if in floors 6 in. thick	„ „	3	10
Add if in beams	„ „	4	9
Add if aggregate 1 : 2: 4	„ „	12	0
Add for hoisting not exceeding 10 ft. beyond the first 10 ft.	„ „	4	0

BRICKLAYER.

		£	s.	d.
Reduced brickwork in lime mortar and Fletton bricks	per rod	41	10	0
Add if in stocks	„	8	10	0
Add if in Staffordshire blues	„	27	0	0
Add if in Portland cement and sand	„	4	0	0

FACINGS.

		s.	d.
Extra for facing in English or Flemish bond for every 10s. per 1,000 over the price of the common bricks	per ft. super	0	0	1¼

POINTING.

		s.	d.
Neat flat strucks or weathered joint	„ „	0	0	3

ARCHES.

		s.	d.
Extra only to the price of ordinary brickwork :—			
Fair external in half brick rings	„ „	0	0	11½
Axed in stocks	„ „	0	1	11
Rubbed and gauged jointed in putty camber or segmental	„ „	0	6	8

SUNDRIES.

		s.	d.
Damp course in double course of slates breaking joint and bedded in Portland cement	„ „	0	1	5
Setting ordinary register grates and stoves	each	1	1	0
Setting kitchener, including forming flues, &c., with all necessary fire bricks	„	5	5	0

ASPHALTER.

		s.	d.
Half-inch horizontal damp course	per yard sup.		6
Three-quarter-inch vertical damp course	„ „	11	8
¾ inch on flats in two thicknesses	„ „	8	6
Angle fillet	per foot run	0	3
Skirting and fillet 6 in. high	„ „	1	4

MASON.

		s.	d.
York stone templates fixed	per foot cube	16	3
York stone sills fixed	„ „	28	6
Bath stone and all labour fixed	„ „	15	0
Portland stone fixed	„ „	23	0

SLATER.

		s.	d.
Welsh 16 in. × 8 in. 3 in. lap, including nails	per square	98	0
Do. 20 in. × 10 in. Do. Do.	„	115	0
Do. 24 in. × 12 in. Do. Do.	„	117	6

CARPENTER AND JOINER.

		s.	d.
Fir framed in plates	per foot cube	7	0
Do. joists	„ „	8	0
Do. roofs, floors and partitions	„ „	8	0
Do. trusses	„ „	10	6

		¾″	1″	1¼″	2″
Deal rough close boarding	per sq.	42/–	48/–	56/–	85/–

		s.	d.
Flat centering for concrete floor, including struts or hangers	„	63	0
Do. to beams	per ft. sup.	1	6
Centres for arches	„	2	0
Gutter boards and beams	„	1	8

FLOORING.		¾″	1″	1¼″	1½″
Deal-edges shot	per sq.		49/–	58/–	67/–
Do. tongued and grooved	„		54/–	65/–	72/–
Do. matchings	„	45/–	55/–		
Moulded skirting, including backings and grounds	per ft. sup.	2/–	2/3	2/9	3/3

SASHES AND FRAMES.		s.	d.
One-and-a-half moulded sashes or casements	per foot super	1	11
Two Do. Do. Do.	„ „	2	4½
Add for fitting and fixing	„ „	0	6
Deal-cased frames with 1 in. inner and outer linings, 1¼ in. pulley stiles tongued to linings, hard wood sills with 2 in. moulded sashes in squares double hung, double hung with pulleys, lines and weights; average size	„ „	4	11

DOORS.		1½″	1¾″	2″
Two panel square framed	per ft. sup.	2/6	2/9	2/11
Four-panel Do.	„	2/10	3/2	3/5
Two panel moulded both sides	„	3/2	3/5	3/8
Four-panel Do. Do.	„	3/6	3/9	4/–

CARPENTER AND JOINER—continued.

FRAMES.

		s.	d.
Deal wrot moulded and rebated	per foot cube	19	0

		1″	1¼″	1½″
Plain deal jamb linings framed	per ft. sup.	1/11	2/–	2/3
Deal shelves and bearers	„	1/8	1/10	2/1
Add if cross tongued	„	2d.	2d.	2d.

STAIRCASES.

	1″	1¼″	1½″	2″	2½″
Deal treads and risers in and including rough brackets	2/10	3/6	4/–	—	—
Deal strings wrot in both sides and framed	3/10	4/1	—	—	—

		s.	d.
Housings for steps and risers	each	0	11½
Deal balusters, 1 in. × 1¼ in.	per ft. run.	0	9
Mahogany handrail; average 3 in. × 3 in.	„ „	6	0
Add if ramped	„ „	11	10
Add if wreathed	„ „	23	9

FIXING ONLY IRONMONGERY (INCLUDING SCREWS).

6 in. barrel bolts	8½d.	Rim locks	2/4½
Sash fasteners	11½d.	Mortice locks	5/3
Casement fasteners	1/5	Patent spring hinges and letting in to floor and making good	19/–
Casement stays	1/2		
Cupboard locks	1/5		

FOUNDER AND SMITH.

		s.	d.
Rolled steel joists	per cwt.	21	0
Plain compound girders	„	24	0
Do. stanchions	„	27	0
In roof work	„	33	0

RAIN-WATER GOODS.

		3″	4″	5″	6″
Half-round plain rebated joints	ft. run	1/11	2/4½	3/7	4/–
Ogee Do. Do.	„	2/4½	3/1	3/10	4/9
Rain-water pipes with ears	„	2/9	3/7		
Extra for shoes and bends	each	4/4	5/11		
Do. stopped ends	„	1/11	2/4½	3/7	4/–
Do. nozzles for inlets	„	2/2	2/7	3/10	4/3

PLUMBER.

		s.	d.
Milled lead and laying in flashings and gutters	per cwt	56	0
Do. Do. in flats	„	52	0
Extra labour and solder in coated cesspools	each	7	4
Welt joint	per ft. run.	0	6
Soldered seam	„ „	1	10½
Copper nailing	„ „	0	7

	½″	¾″	1″	1½″	2″	4″
Drawn lead waste per ft. run	10d.	1/3	1/9	3/1	3/10	
Do. service „	1/5	1/11	2/3	3/6		
Do. soil „						6/2
Bends in lead pipe each					3/3	8/2
Soldered stop ends „	1/2	1/8	2/1	2/10	3/6	
Red lead joints „	11d.	1/–	1/3	1/11	2/4	4/10
Wiped soldered joints „	2/10	3/6	4/–	4/11	6/6	9/9
Lead traps and cleaning screws „				14/7	19/6	
Bib cocks and joints „	6/4	9/7	15/4	41/–		
Stop cocks and joints „	15/4	17/2	25/8	64/–		

PLASTERER.

		s.	d.
Render, float and set in lime and hair	per yard sup.	3	2
Do. Do. Sirapite	„ „	3	7
Do. Do. Keen's	„ „	4	9
Add sawn lathing	„ „	1	11
Add metal lathing	„ „	3	4
Portland cement screed	„ „	2	9
Do. plain face	„ „	4	6
Mouldings in plaster	per 1 girth	0	3
One-and-a-half granolithic pavings	per yard sup.	6	7

GLAZIER.

		s.	d.
21 oz. sheet plain	per foot sup.	1	1
26 oz. Do	„ „	1	4
Obscured sheet	„ „	1	8
⅛ in. rolled plate	„ „	1	0
¼ in. rough rolled or cast plate	„ „	1	1
¼ in. wired cast plate	„ „	1	7

PAINTER.

		s.	d.
Preparing and distempering, 2 coats	per yard sup.	1	3
Knotting and priming	„ „		8
Plain painting 1 coat	„ „	1	0
Do. 2 coats	„ „	1	9
Do. 3 coats	„ „	2	6
Do. 4 coats	„ „	3	3
Graining	„ „	2	8
Varnishing twice	„ „	2	0
Sizing	„ „	0	4
Flatting	„ „	0	8
Enamel	„ „	1	6
Wax polishing	per foot sup.	0	10½
French polishing	„ „	1	3
Preparing for and hanging paper	per piece	2/– to 5/–	

* These prices apply to *new buildings only*. They cover superintendence by foreman and carry a profit of 10% on the prime cost without establishment charges. A percentage of 11 should be added for Employers' Liability and National Health and Unemployment Acts and from 1s. 6d. per £100 for Fire Insurance. The whole of the information given on this page is copyright.

TRADE NEWS.

The Electric Lamp Manufacturers' Association, which concerns itself with the efficiency and reliability of lamps and stabilisation of prices, also acts as a direct stimulus to the spread of electric lighting. The success of the publicity work undertaken by individual lamp firms led the Association to attempt two years ago to supplement it by a combined effort to set forth, chiefly by advertisements in the Press, not the advantages of any particular lamp, but the broad advantages of electric light and of the lamps which bear the hall-mark of the Association. The results were so good that the Association has arranged for another national publicity campaign during the present season. This campaign has two phases. One is to create a livelier demand for electric light and E.L.M.A. lamps, and the second is to invite the active co-operation of the electrical trade. A well-organised campaign on an extensive scale must lead to a material increase in the demand for E.L.M.A. lamps; in creating business for itself the Association creates it for every member of the lamp trade. Increased sales of lamps bring an augmented demand for reflectors and fittings, for numerous accessories, and for installation work in general. Every user of electric lamps is a potential buyer of other current-consuming appliances. With the growth of electric light and its consequent demands there comes an increase in the output of electricity supply stations and a need for more generating plant, transformers, switchgear, cables, and electrical supplies in general.

A patent reinforced continuous wood lathing has been put on the market by the Weston-Reuter Co., Ltd., of 61–62, Gracechurch-street, E.C.3, in which the laths are held apart by galvanised iron wire at right angles to their length at intervals of about 9 in. In applying the "Weston-Reuter" system to ceilings, a staging is erected at such a height that the workmen can easily hold the lathing tight up to the joists while fixing. A roll of lathing having been fitted on to the staging, it is partly unrolled for a length slightly in excess of the height from the platform to ceiling; it is then held tightly to the underside of the joists and secured by means of small staples. As additional lathing is fixed the roll is unwound and pushed forward on the stage. The lathing is applicable for fixing to beams supporting concrete floors, but in these cases the lathing is fixed by means of clips or binding wire to steel rods. These rods also obtain additional support at intervals from wire stirrups, which are cast in the concrete and pulled down after the centering is struck, thus giving a hollow insulating space between the soffit of the concrete and the ceiling. It is claimed that the lathing is particularly suitable for employment in false work to curved surfaces, ceilings, vaults, &c., owing to its strength across the rolls. While the lathing is strong in the direction of lengths of the laths, it is easily bent and fitted to any curve longitudinally as the only resistance to be overcome is the reinforcing wiring connecting the wood laths. Lathing applied to vertical faces is fixed in a similar manner to that for ceilings, but the roll is unwound on the floor and the unwound portion is raised to the ceiling, where it is fixed to the studding by means of staples. The fixing is completed downwards from ceiling to floor. The lathing is supplied in rolls 33 ft. long and in widths from 2 ft. 7 in. to 6 ft. 6 in., and any dimensions are made to order. Judging from a sample we have seen, the lathing is very rigid, and would seem to be well suited for its purpose.

Rebuilding in St. Helen's-place, E.C.

The Great Northern Telegraph Co. has acquired from the Leathersellers' Company the lease of land in St. Helen's-place, Bishopsgate, on which six old houses are built. The six houses to be demolished were built on the site of Little St. Helen's in 1799, and will be replaced by a block of modern offices.

A Builder's Estate.

The late Mr. Thomas V. Burrows, of Hose Side, Wallasey, builder and contractor, ex-Mayor of Wallasey, left estate valued at £47,205.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach him not later than Tuesday evening.

* Denotes *accepted*. † Denotes *provisionally accepted*.
‡ Denotes *recommended for acceptance*.
§ Denotes *accepted subject to modifications*.

ABERDEEN.—For the construction of a sewer in Back Hilton-road, for the T.C. :—
*J. Leith £859

ABERDEEN.—For electrical installation at workshops at Police Station, for the T.C. :—
*Bell & Robertson £400

ALTRINCHAM.—For erection of a Sunday school, in connection with the Primitive Methodist Church. Mr. T. H. Hill, architect, 1, Market-street, Altrincham. Quantities by architect :—

J. A. Massey & Son, Ashton-on-Mersey	£2,509
S. P. Bidder & Co., Manchester	2,439
Chas. Jones & Sons, Manchester	2,164
J. & J. Parish, Withington	2,072
Briggs, Son & Rensham, Manchester	1,900
Smith & Briggs, Manchester	1,899
J. Chapman & Sons, Patricroft	1,880
Geo. Holmes & Co., Warrington	1,820
National Building Guild, Manchester	1,800
*P. Hamlett, Altrincham	1,770

BATH.—For redecoration at Municipal Technical College, for the T.C. :—
*J. Long & Sons £129

BATH.—Reconstruction of tepid swimming bath, for the T.C. :—
*Jacob Long & Sons £9,222

BATH.—For erection of 100 houses at Englishcombe Park, for the T.C. Mr. A. J. Taylor, architect, 18, New Bond-street, Bath. Quantities by Mr. W. E. Underwood, 1, Northumberland-buildings, Bath :—

	North aspect per pair.	*South aspect per pair.*
F. J. Blackmore, Bath	£1,484 10	1,490 10
H. G. Clark, Bath	1,445 0	1,475 0
Hayward & Wooster, Bath	1,394 0	1,394 0
Dunthorn, Ltd., Glastonbury	1,380 0	1,340 0
Chancellor & Sons, Bath	1,377 0	1,400 0
A. H. Pickford, Bath	1,375 0	1,384 0
Button & Greenham, Bath	1,349 6	1,374 8
R. Wilkins & Sons, Bristol	1,304 0	1,318 0
Purnell & Clifford, Reading	1,358 0	1,358 0
Dare & Wareing, Birmingham	1,350 0	1,290 0
A. Wills & Sons, Ltd., Bath	1,340 0	1,320 0
A. J. Hill, Bath	1,280 0	1,260 0
John Knox, Evesham	1,272 0	1,266 0
H. Sheppard & Sons, Bath	1,256 0	1,226 0
Williams & Worrell, Bath	1,390 0	1,390 0
Erwood & Morris, Bath		1,250 0
Building Guild, Manchester	1,244 0	1,219 0
James Bodle, Ltd., Eastbourne	1,227 0	1,200 0
Harry Neal, Northwood	1,200 0	1,180 0
Chivers & Sons, Devizes	1,198 0	1,190 0
F. Amery & Son, Bath	1,198 0	1,198 0
Coles Bros., Ltd., Bath	1,100 0	1,110 0
*J. Long & Sons, Ltd., Bath	1,100 0	1,100 0

BIRKENHEAD.—For the erection of 54 houses on Hoylake-road and Sumner-street estate, for the T.C. :—
*R. Costain & Sons £33,533
(*Revised.*)

BIRMINGHAM.—For remodelling the infants' department of Dartmouth-street Council School, for the T.C. :—
*R. Fenwick, Ltd. £3,860

CHISWICK.—For proposed (1) construction of ferro-concrete culvert; (2) erection of 8 slipper baths and caretaker's flat; (3) conversion of wooden shed at open-air bath into dressing boxes. Mr. E. Willis, Engineer and Surveyor, Town Hall, Chiswick :—

(1)

Walkerdine, Ltd., London	£35,530	0	0
Kirk & Randall, Westminster	17,500	0	0
Wimpey & Co., Hammersmith	13,920	0	0
Davidson & Sykes, Westminster	12,710	0	0
F. Cressy, Chiswick	10,609	15	0
*Peter Lind & Co., Westminster	9,985	0	0

Engineer's estimate, £9,400.

(2)

F. G. Cressy, Chiswick	5,400	0	0
T. Millman, Ealing	4,460	0	0

Engineer's estimate, £3,500.
(*Work deferred.*)

(3)

F. Pearce, Balham	680	0	0
F. G. Cressy, Chiswick	660	18	6
T. Millman, Ealing	578	0	0

Engineer's estimate, £600.
(*Work deferred.*)

DARLINGTON.—For erection of Church of England Waifs' and Strays' Home, Darlington. Messrs. Joseph Potts & Son, architects and surveyors, 57, John-street, Sunderland :—
*Alfred Robinson, Bradford £10,600

EDINBURGH.—For supply of 550 tons of cast-iron pipes to the Water Department of the T.C. :—
*Macfarlane, Strang & Co., Glasgow .. £5,778

GLASGOW.—Construction of roads and sewers at Kelvindale, for the T.C. :—
*H. M. Murray & Co. £17,622 15 3

GLASGOW.—For painting work at Stirling's Library, for the T.C. :—
*R. P. Brodie, Glasgow £312 1 8

GLASGOW.—For painting work at bridge over River Kelvin, at Great Western-road, for the T.C. :—
*M'Culloch & Co. £555 8 6

GLASGOW.—For painting work on roof of the Horse Market, for the T.C. :—
*G. & J. Rae, Ltd., Glasgow £1,114 5 10

GLASGOW.—For the erection of a bothy at the Dalmarnock Sewage Works, for the T.C. :—
*John MacDonald (Contractors), Ltd. £1,060

GLASGOW.—For painting work at Ruchill Hospital, for the T.C. :—
*G. Sartin, Glasgow £902 9 2½
*A. Gilchrist & Sons, Glasgow .. 309 12 7
*G. Sartin, Glasgow 268 2 9½

GLASGOW.—Installation of disinfector at Belvedere Hospital, for the T.C. :—
*Manlove, Alliott & Co. £540

GLASGOW.—Installation of laundry machinery at Knightswood Hospital, for the T.C. :—
*J. Ritchie, Glasgow £5,331 18

HALIFAX.—Supply of baling press for dealing with old tins, for the T.C. :—
*Spencer & Cook, Stalybridge £395

HALIFAX.—Construction of concrete roof to Park-road bath, for the T.C. :—
*Geo. Greenwood & Sons, Halifax .. £1,885

HALIFAX.—Supply of clinker washing machine for the sewerage works, for the T.C. :—
*W. H. Baxter, Ltd., Leeds £317 10

HALIFAX.—Supply of rails, turntables, and tipping wagons, to the T.C. :—
*T. W. Ward, Ltd., Sheffield £225 10

HALIFAX.—For pit extensions at the Skircoat Tram Depot, for the T.C. :—
*C. Wade, Luddenden Foot £452 9 10

HUDDERSFIELD.—For erection of bungalow in Woodside-road, Beaumont Park. Messrs. Lunn & Kaye, architects, Milnsbridge, Huddersfield :—
Masons—
Thos. Bottomley & Son, Huddersfield.
Joiner—
John Hinchliffe, Huddersfield.
Plumber and Electrician—
F. France, Huddersfield.
Roof tiler and plasterer—
A. Bower, Huddersfield.
Painter—
H. A. Spivey, Huddersfield.
Concreter—
John Cooke, Huddersfield.

ILKESTON.—For heating apparatus at Bennerley-avenue Infants' School, for the T.C. :—
*T. Danks & Co. £112

LANCHESTER.—For construction of about 250 yards of 9 in. earthenware and cast-iron pipe sewer, &c., at Langley Park, for the R.D.C. Mr. J. R. Lupton, Surveyor, Lanchester :—
*Robert Gallagher, Blackhill .. £404 4 6

LONDON.—For provision of handrail on main staircase of Council Chamber, for the St. Marylebone B.C. :—
*Elliott & Sons, Reading £178 13 6

LONDON.—For erection of 13 pram sheds in the cartyard of Chester House housing estate, for the St. Pancras B.C. :—
*A. Monk £228

LONDON.—For building work in connection with extension of engine room at King's-road generating station, for the St. Pancras B.C. :—

		Time to complete.
Whitehead, Ltd.	£31,969	10–11 months
Albert Monk	31,685 10	,,
*Somerville & Co., Ltd.	31,300 6½	,,
Dilliway & Elvy	31,047 10	,,

LONDON.—For redecorating Town Hall, for the Stoke Newington B.C. :—
W. H. T. Kelland & Sons, Ltd. £591
S. Goodall & Son 567
*Stapleton & Sons 524

MANSFIELD.—For erection of public urinal, for the T.C. :—
*A. R. Roe £316 5

PORTSMOUTH.—For structural repairs at Francis-avenue Council School, for the Portsmouth Education Committee. Mr. G. W. Allen, Secretary, Education Committee, Town Hall, Portsmouth :—

Pryer & Sons, Southsea	£357 10
Davis & Son, Southsea	205 10
Frank Corke & Co., Southsea	179 0
Tanner Bros., Southsea	140 0
Lay & Co., Portsmouth	137 0
J. Crockerell, Southsea	135 0
Light Bros., Portsmouth	120 0
Wigmore & Son, Southsea	107 0
Till & Sons, Southsea	100 10
*Howe & Bishop, Southsea	95 0

SALFORD.—For supply of materials to the Tramways Committee of the T.C. :—

*H. Heys & Co., Ltd., Stacksteads —Limestone chippings	£229	2	0
*Abel Lighterage & Ballast Co., Liverpool—Sand	203	2	6
*Hardman & Holden, Ltd., Manchester—Creosote	208	6	8
*Lancashire Chemical & Mineral Co., Manchester—Sand	265	12	6

SALFORD.—For painting, &c., at (*a*) Seedley Baths, and (*b*) Regent and Blackfriars Baths, for the T.C. :—
*(*a*) E. Tate & Co..... £149 10
*(*b*) R. H. Worship & Son..... 271 8

SALFORD.—Supply of fireclay material to the Gas Department of the T.C. :—
*Mobberley & Bayley, Stourbridge —Schedule of Prices, amounting approximately to..... £308 5 4
*Harrison, Ltd., Stourbridge— Schedule of Prices, amounting approximately to..... 317 17 9
*Gibbons (Dudley), Ltd., Dudley— Schedule of Prices, amounting approximately to 2,063 15 3

SOUTHEND-ON-SEA.—For erection of three stone tracery windows at Prittlewell Priory, for the T.C. :—
*P. F. Smith, Southend..... £140

WANDSWORTH.—For extension of offices, St. John's Hospital, St. John's Hill, S.W. 18, for the Wandsworth Union :—

Welchman & Wise, S.W.7	£589	0
F. C. Flack, S.W.18	575	0
W. & C. Brown, Ltd., S.W.18	565	0
W. Daley & Co., Acton	550	0
A. Phelps & Wilton, Ltd., S.W.2..	534	0
T. Pearce, S.W.17	500	0
R. Mansell, Croydon	428	0
G. H. King & Sons, S.W.11.....	380	0
J. J. Woollaston, N.17	375	0
*R. Haslam & Son, S.E.18	266	12

WOKING.—For electric light installation at Maybury School, for the U.D.C. :—
*Woking Electric Light Co..... £156 5

YORK.—For conversion of buildings at Fairfield Sanatorium into a dwelling-house, for the Health Committee. Mr. F. W. Spurr, City Engineer, Guildhall, York.
*F. Shepherd & Son, York £550

CALENDARS, &c., FOR 1922.

Messrs. Stevens, Horlock & Co., builders, of Cambridge Works, Vyner-street, Hackney, E.C.2, have sent us a calendar of the perpetual type, with interchangeable cards for the days and months.

In addition to the wall calendar noted in our last issue, we have received from Mr. Lewis E. Nunn, builder, decorator and sanitary engineer, of Crompton-street, W.2, a neat desk calendar, with monthly pages.

A one-day-a-page wall calendar has been issued by Mr. Frank S. Mayo, of 11, Queen Victoria-street, E.C.

We have received a circular desk calendar, with a tear-off page for each day, from Messrs. Beck & Inchbold, Ltd., of Leeds.

Mr. Charles Selz, silk lamp shade manufacturer, of 83, George-street, Portman-square, W.1, has accompanied his New Year wishes with a useful present, in the form of a combined pencil-holder and pipe-lighter, made on the same lines as a fountain pen complete with a pocket-clip.

We have received from Mr. E. Parkinson, slate and tile merchant and roofing contractor, of 89, Mount Pleasant-road, N.15, a well-produced wall calendar, illustrated with a coloured view of the terrace at Haddon Hall.

A large wall calendar, got up in tasteful style and containing a reproduction of a picture, "Autumn Afternoon," by E. W. Haslehurst, R.B.A., has come to hand from Messrs. R. A. Evans, Ltd., the well-known lift engineers, of Leicester.

Messrs. Griggs & Son, building contractors, of 100, Victoria-street, Westminster, S.W.1, have issued a wall calendar for 1922.

A wall calendar for 1922 has been received from the Ashford and Naccolt Brick and Tile and Potteries, Ltd., of 7, Bank-street, Ashford, Kent.

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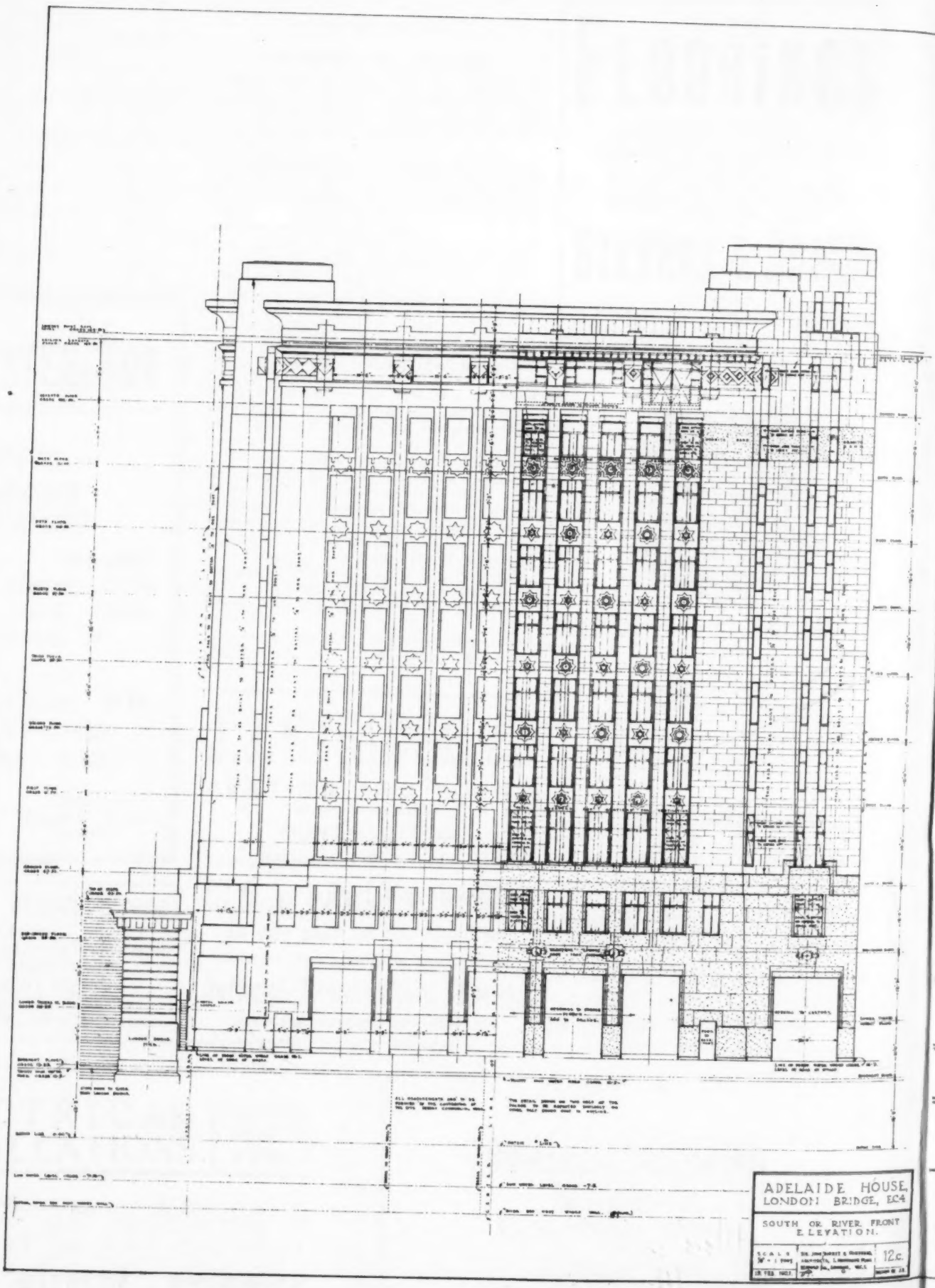
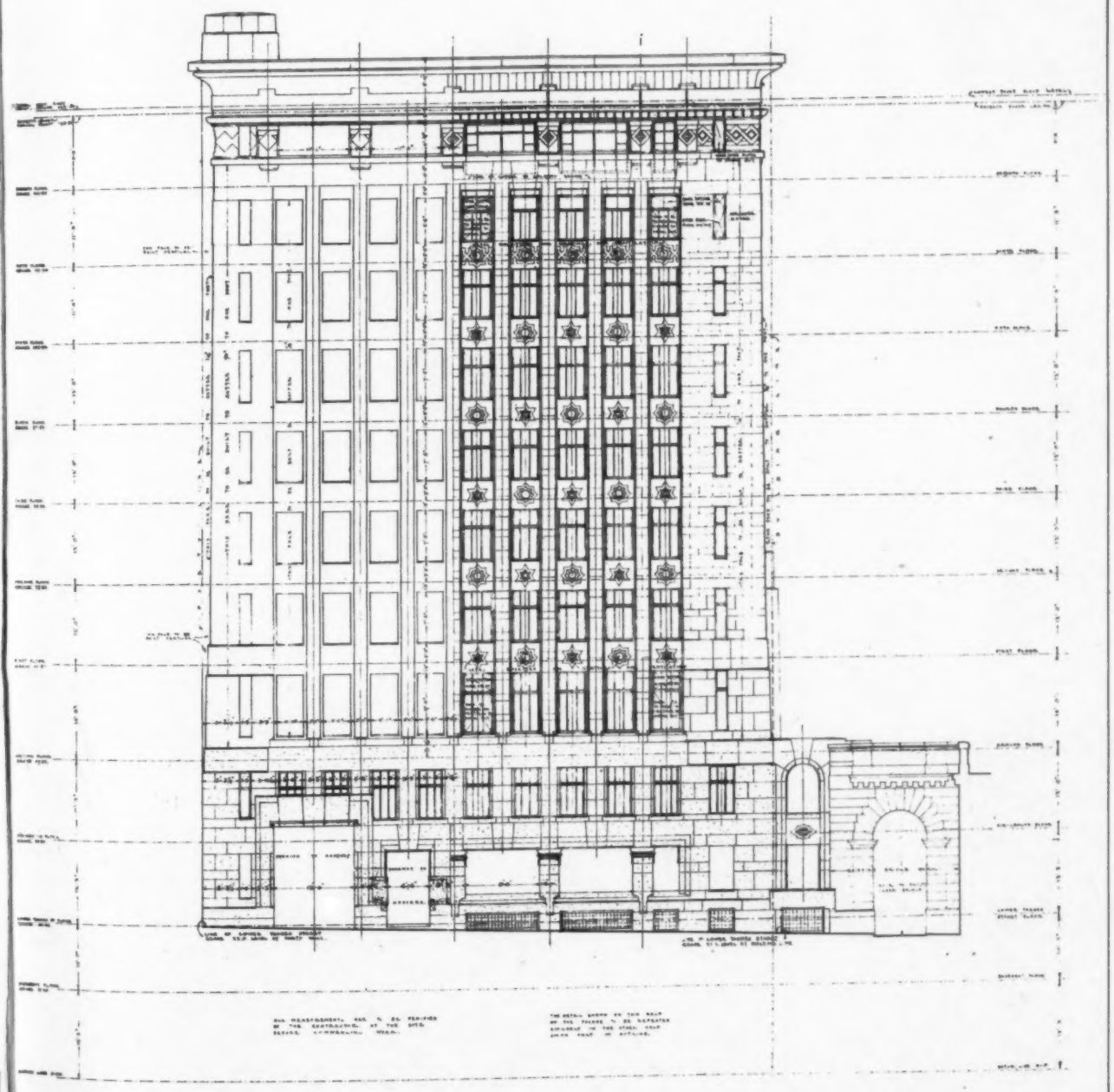


ADELAIDE HOUSE, LONDON BRIDGE. SIR JOHN J. BURNET



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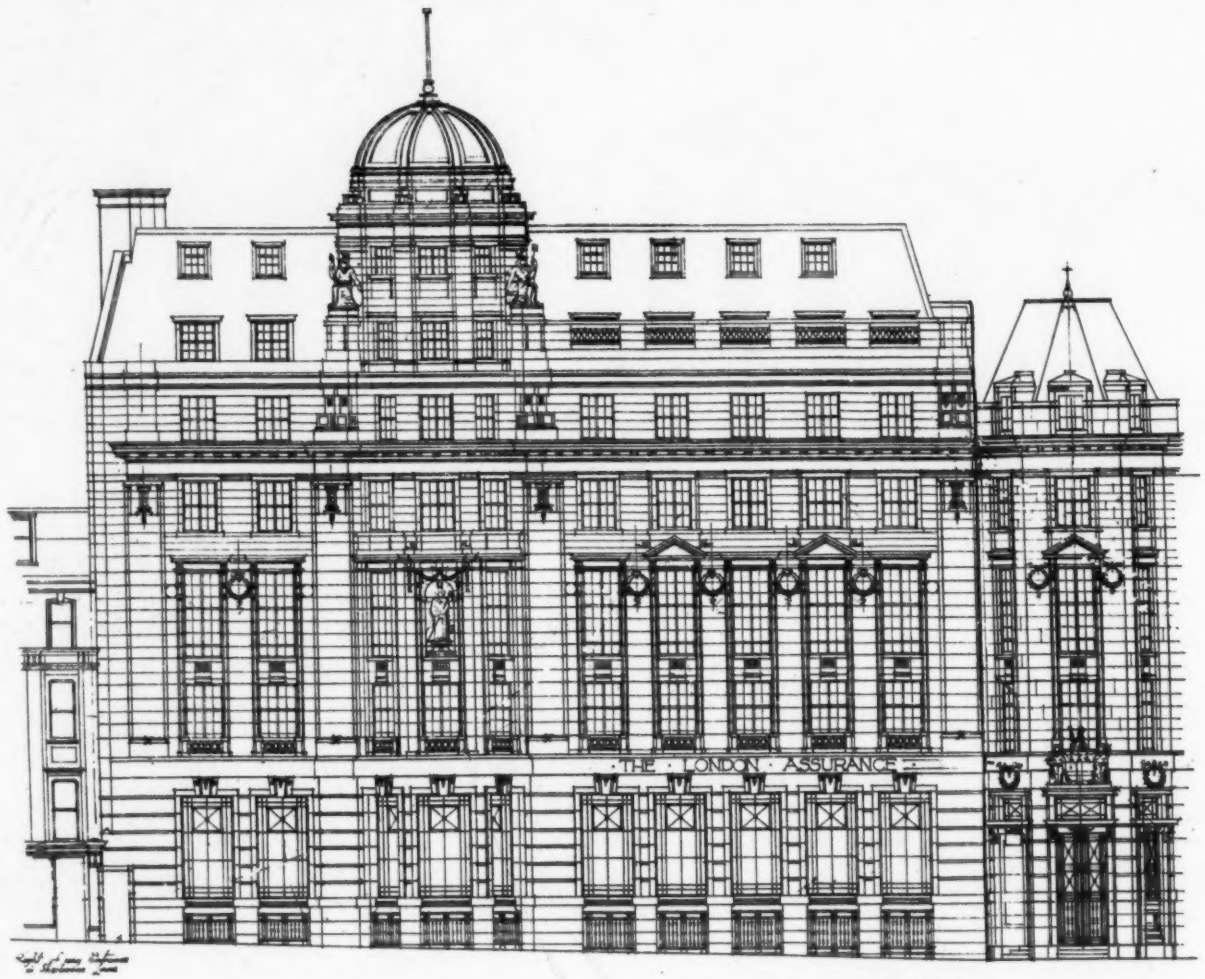

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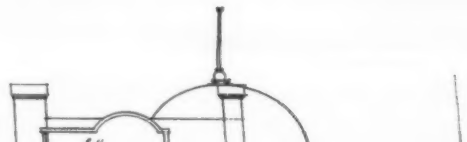
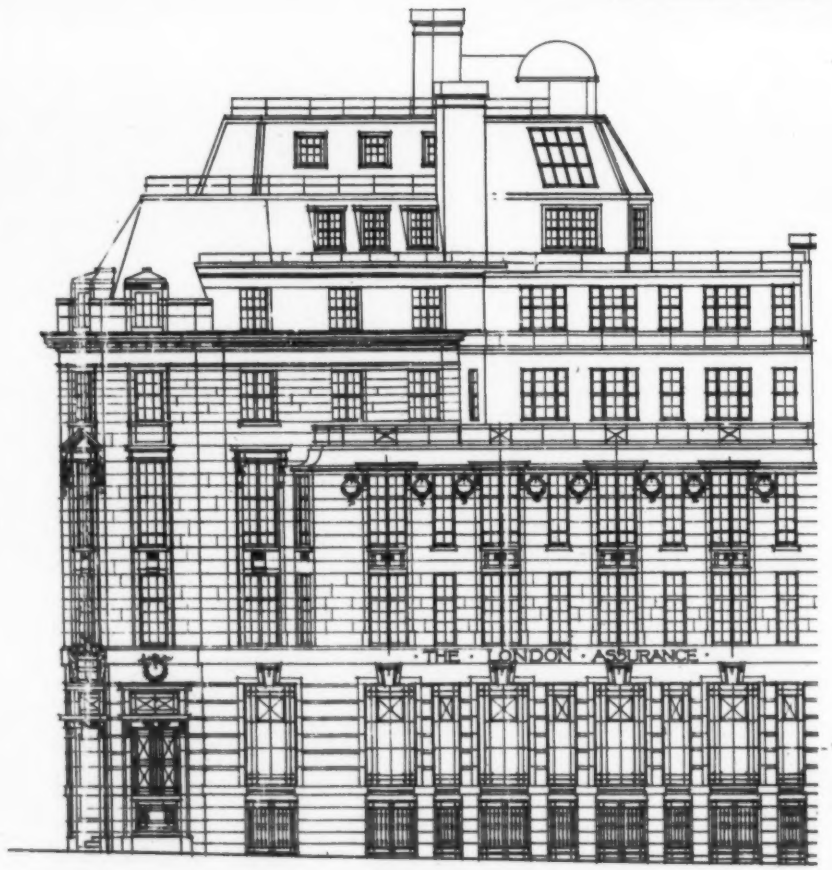
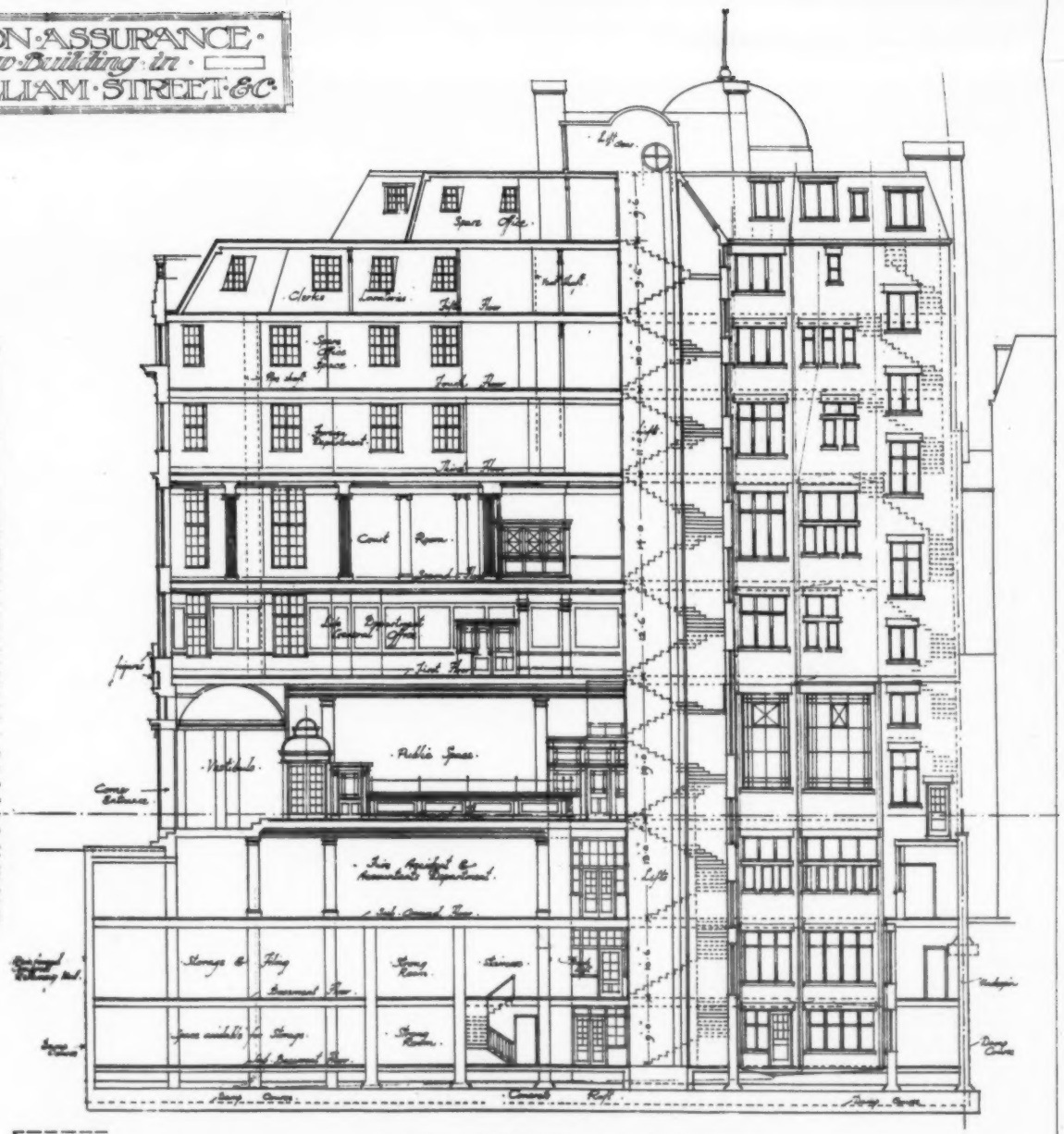


The LONDON ASSURANCE
Proposed New Building in KING WILLIAM STREET &c.



ELEVATION to ST SWITHINS LANE



SECTION on the A-A

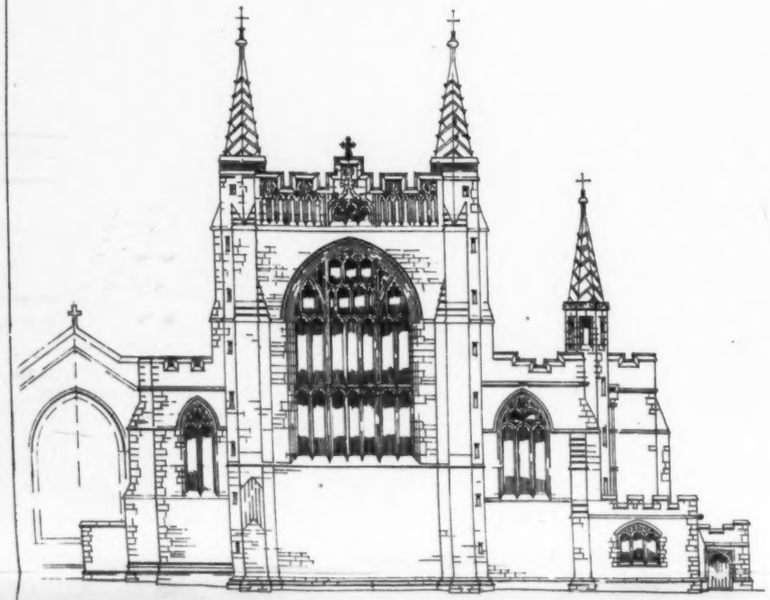
Scale Eight feet to One Inch

BUILDER. JANUARY 6. 1922.

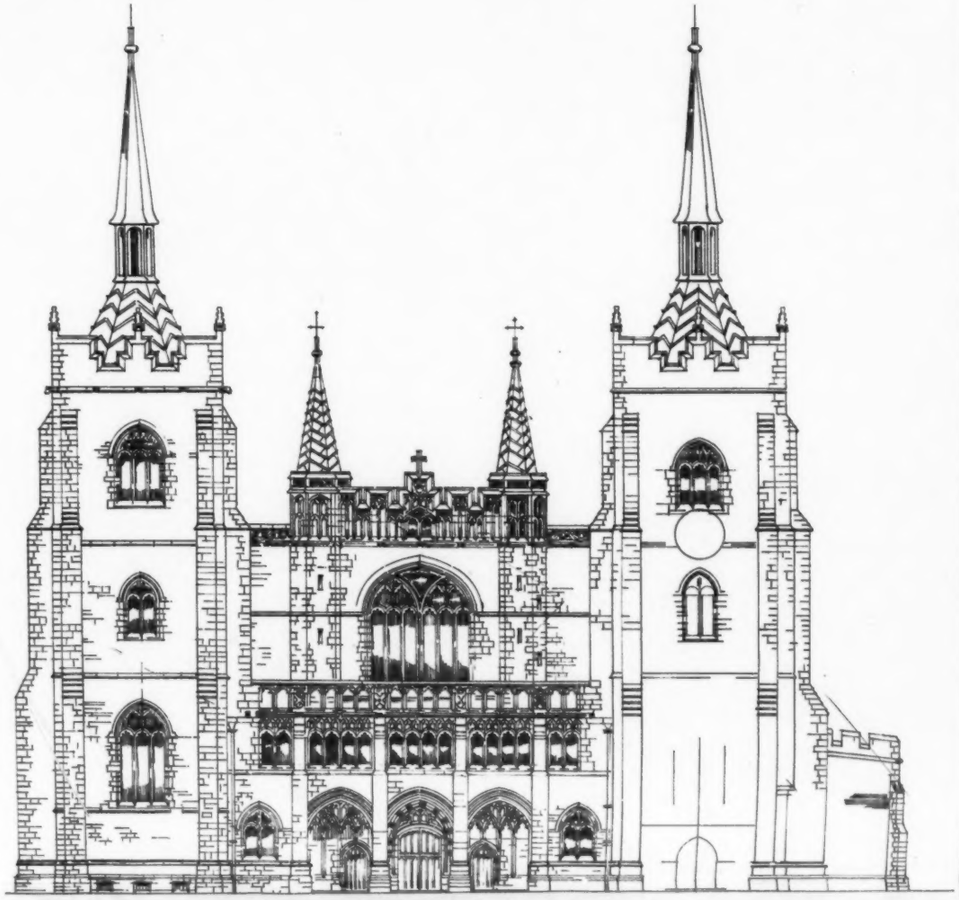
MESSRS. CAMPBELL JONES, SON & SMITHERS, ARCHITECTS.

CHELMSFORD CATHEDRAL

SCALE 1 inch = 8 feet 0 4 8 12 16 20 24 28 32 FEET



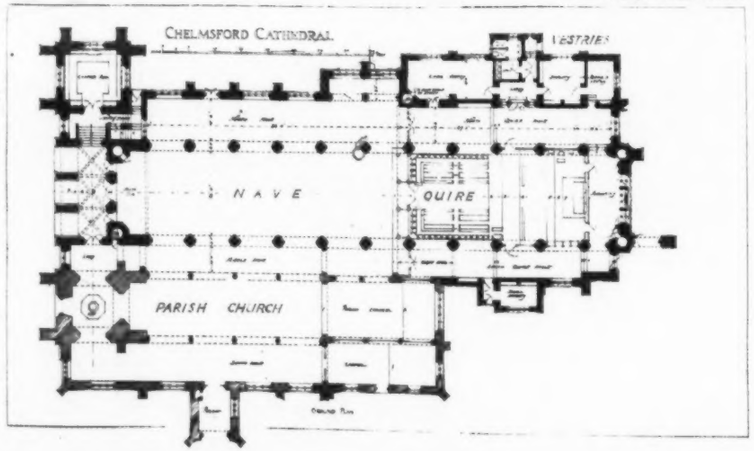
EAST ELEVATION

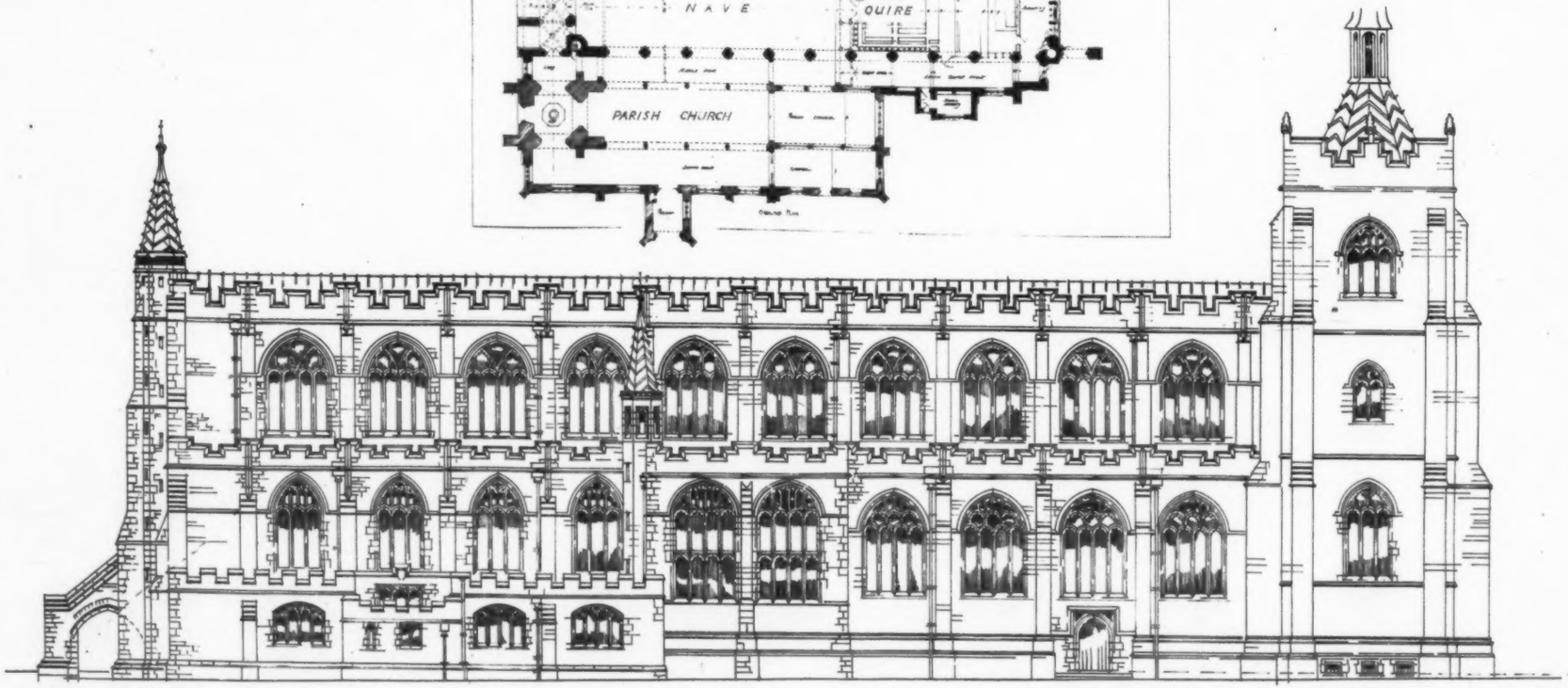


WEST ELEVATION

EAST ELEVATION

WEST ELEVATION





NORTH ELEVATION

SIR CHARLES A. NICHOLSON, BART., F.R.I.B.A., ARCHITECT.

"THE BUILDER" CA

Architecture can want no commendation where there are noble mer

JANUARY

S	1	8	15	22	29	
M	2	9	16	23	30	
T	3	10	17	24	31	
W	4	11	18	25		
Th	5	12	19	26		
F	6	13	20	27		
S	7	14	21	28		

FEBRUARY

S		5	12	19	26	
M		6	13	20	27	
T		7	14	21	28	
W	1	8	15	22		
Th	2	9	16	23		
F	3	10	17	24		
S	4	11	18	25		

MARCH

S		5	12	19	26	
M		6	13	20	27	
T		7	14	21	28	
W	1	8	15	22	29	
Th	2	9	16	23	30	
F	3	10	17	24	31	
S	4	11	18	25		

APRIL

S		2	9	16	23	30
M		3	10	17	24	
T		4	11	18	25	
W		5	12	19	26	
Th		6	13	20	27	
F		7	14	21	28	
S	1	8	15	22	29	

MAY

S		7	14	21	28	
M	1	8	15	22	29	
T	2	9	16	23	30	
W	3	10	17	24	31	
Th	4	11	18	25		
F	5	12	19	26		
S	6	13	20	27		

JUNE

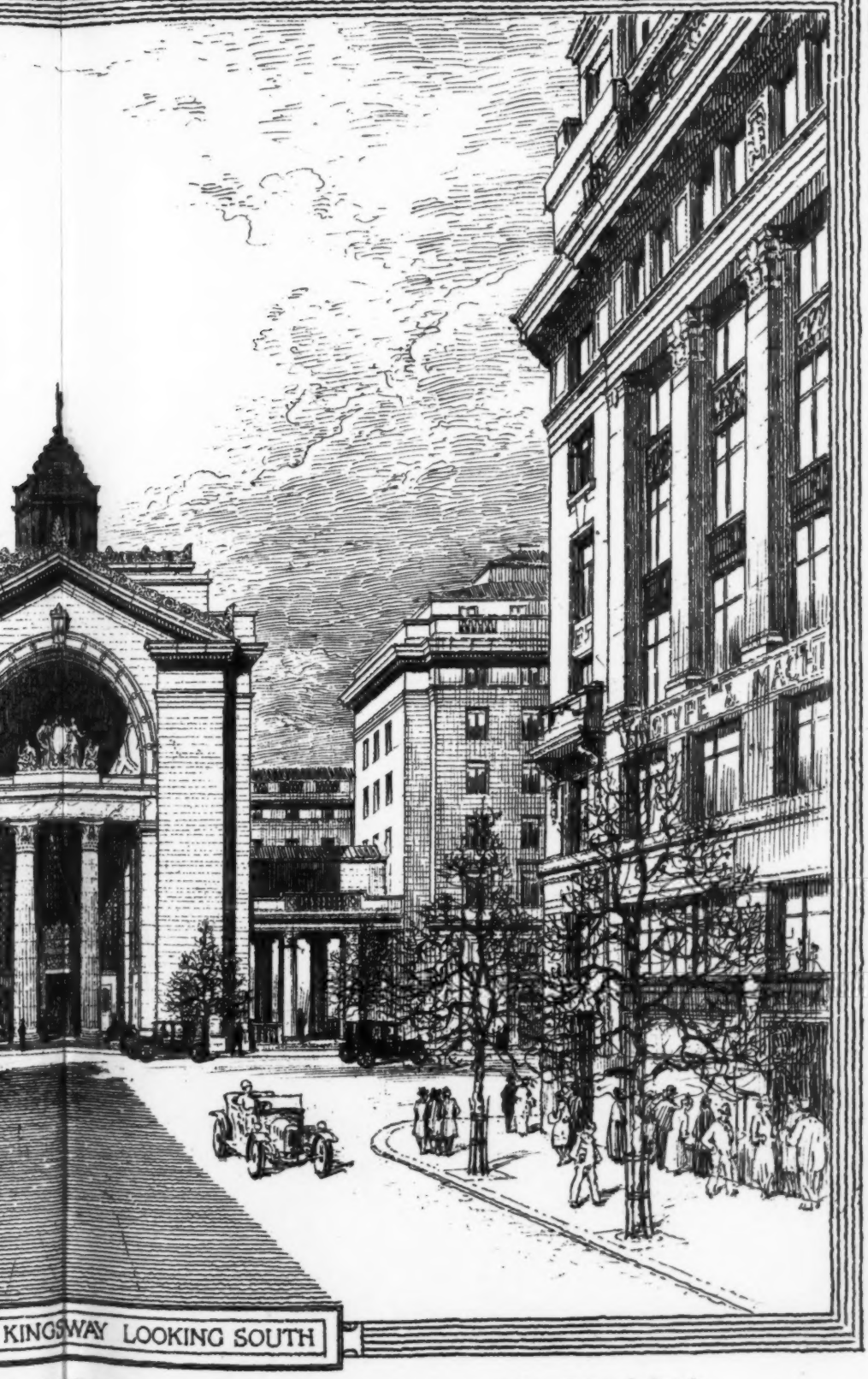
S		4	11	18	25	
M		5	12	19	26	
T		6	13	20	27	
W		7	14	21	28	
Th	1	8	15	22	29	
F	2	9	16	23	30	
S	3	10	17	24		

NEW LONDON - KINGSWAY L

In the centre of the view is shewn part of the northern frontages of the Bush Buildings
The buildings on each side of the view are offices & shops from the d

CALENDAR 1922

are noble men or noble mindes --- Sir Henry Wotton ---



KINGSWAY LOOKING SOUTH

JULY						
	2	9	16	23	30	S
	3	10	17	24	31	M
	4	11	18	25		T
	5	12	19	26		W
	6	13	20	27		Th
	7	14	21	28		F
1	8	15	22	29		S

AUGUST						
	6	13	20	27		S
	7	14	21	28		M
1	8	15	22	29		T
2	9	16	23	30		W
3	10	17	24	31		Th
4	11	18	25			F
5	12	19	26			S

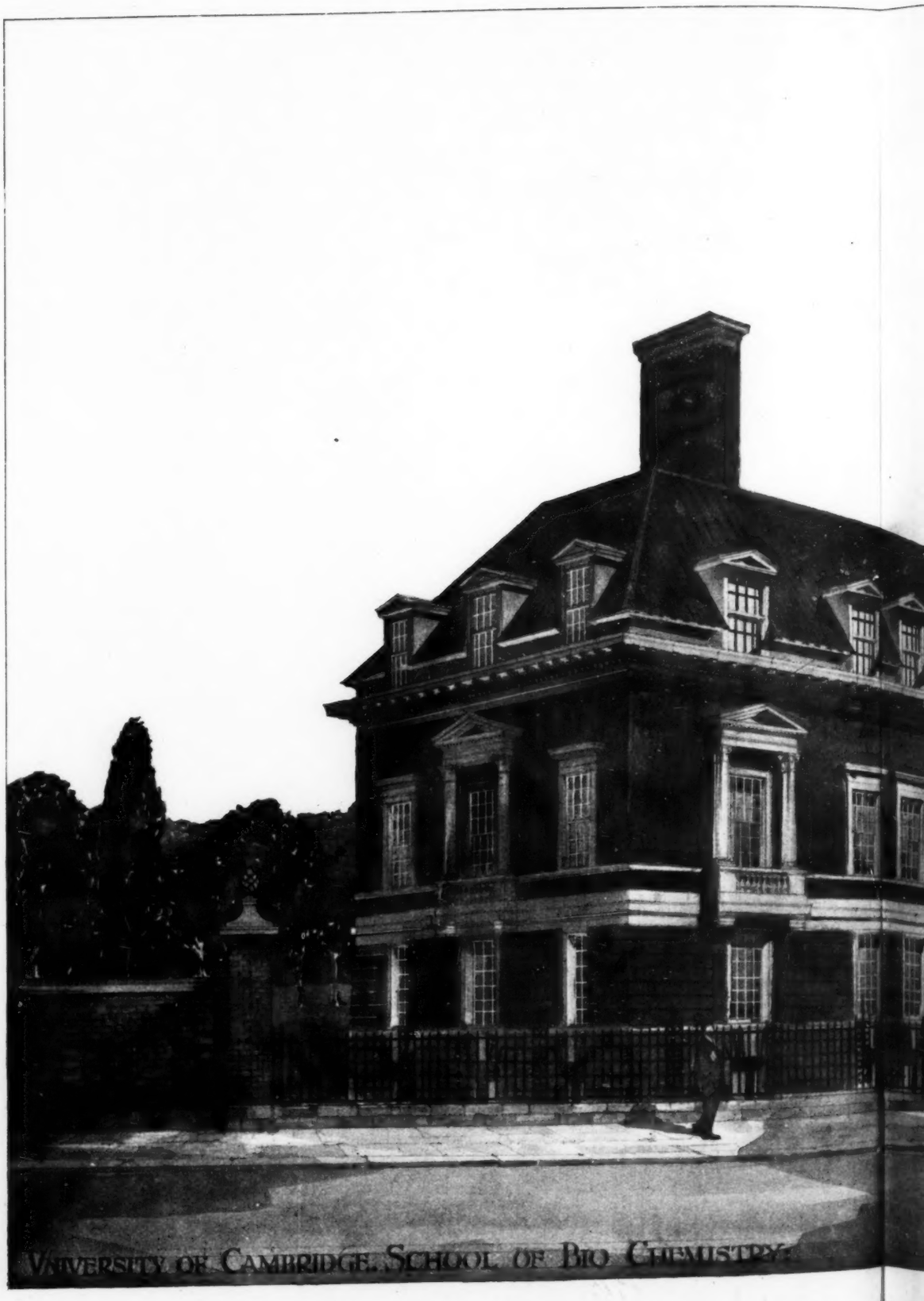
SEPTEMBER						
	3	10	17	24		S
	4	11	18	25		M
	5	12	19	26		T
	6	13	20	27		W
	7	14	21	28		Th
1	8	15	22	29		F
2	9	16	23	30		S

OCTOBER						
1	8	15	22	29		S
2	9	16	23	30		M
3	10	17	24	31		T
4	11	18	25			W
5	12	19	26			Th
6	13	20	27			F
7	14	21	28			S

NOVEMBER						
	5	12	19	26		S
	6	13	20	27		M
	7	14	21	28		T
1	8	15	22	29		W
2	9	16	23	30		Th
3	10	17	24			F
4	11	18	25			S

DECEMBER						
	3	10	17	24	31	S
	4	11	18	25		M
	5	12	19	26		T
	6	13	20	27		W
	7	14	21	28		Th
1	8	15	22	29		F
2	9	16	23	30		S

the Bush Buildings now being erected from the design of Messrs Helmle & Corbett New York
& shops from the designs of Messrs Trehearne & Norman London



UNIVERSITY OF CAMBRIDGE. SCHOOL OF BIO CHEMISTRY.

MR. EDWIN COOPER, F.

. EDWIN COOPER, F.R.I.B.A., ARCHITECT.